Case Studies in Food Policy for Developing Countries

Volume 2

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Case Studies in Food Policy for Developing Countries

Volume 2:
Domestic Policies for Markets, Production, and Environment

Per Pinstrup-Andersen and Fuzhi Cheng
Editors

In collaboration with
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Advisory Task Force and Reviewers

In order to help assure relevancy of the cases and the textbook to real policy situations and problems in developing countries, seven individuals from developing countries (two from each of Africa, Asia, and Latin America and one from the Former Soviet Union) form an advisory task force for the program. These individuals, who are university faculty members, high-level policy advisors, and former policy-makers, advise on all substantive aspects of the program, including the choice and content of cases and the content of the textbook.

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All cases were peer reviewed. A list of reviewers is found on http://cip.cornell.edu/gfs.

Introduction and Overview

Food systems are complex, and public sector action is critical to guide them toward the fulfillment of societal goals. Insufficient understanding of how food systems work, however, and failure to understand the effects of potential and actual government action are major reasons why food systems operate at suboptimal levels. Nowhere are the consequences of a poorly functioning food system more severe than in developing countries, where every fourth preschool child is malnourished and more than 800 million people suffer from food insecurity. At the same time, chronic diseases caused by being overweight or obese are becoming a major public health and economic development problem in both high- and low-income countries. Although per capita food consumption has increased in Asia during the past 40 years, the use of natural resources to bring about the increase has not been sustainable, and an increasing amount of the food consumed is imported from outside Asia—a trend that is projected to continue. In Africa, food consumption per capita has not increased significantly during the past 30 years and degradation of natural resources is widespread. High energy prices are putting pressure on food systems through increasing demand for biofuels, and large food price increases during 2007–08 caused serious hardship for millions of poor people. Food riots in more than 30 countries have threatened the legitimacy of governments. Agricultural trade policies pursued by the United States, the European Union, and Japan are adversely affecting poverty and food insecurity in developing countries. At the same time, modern science—including molecular biology—and globalization offer new and exciting opportunities for the sustainable agricultural development needed for poverty alleviation.

Food policy is a plan of collective action intended to influence and determine decisions, actions, behavior, and perceptions to enable people to achieve certain objectives. More specifically, food policy consists of the setting of goals for the food system or its parts, including natural resources (such as soils, water, and biodiversity), production (crops and animals), processing, marketing, food consumption (including food safety) and nutrition (including nutrition-related health), and the processes for achieving these goals at a local, national, regional and global level. By setting regulations or changing incentives for different stakeholders, food policy shapes the structure and functioning of the food system in the direction of the intended goals. Government action is likely to include conflicting goals and policy measures that may contradict each other. Furthermore, few governments pursue a consistent set of goals for policy intervention over time.

The reasons for food policies vary from country to country and can change over time. But since food fulfills a basic human need, providing sufficient food of adequate nutritional quality for each individual has been the most important of all food policy objectives over time. In addition to this, modern food policy includes objectives such as farm income support, economic growth, poverty reduction, and equality as well as environmental protection.

Several patterns of food policy are common across countries, irrespective of their cultural, historical, or sociological heritage or geographical location. There exists a general tendency to discriminate against farming in poor countries and to subsidize farmers in rich countries. In addition, developing countries tax agriculture mostly through indirect means (e.g., overvalued exchange rates and import barriers on inputs into agriculture) rather than direct means (e.g., price controls via parastatal organizations), while sectors with comparative advantage are taxed more heavily (e.g., plantation-based export sectors vs. small-holder import-competing agriculture). To understand these patterns, or more generally why governments do as they do with respect to food, a careful analysis of food policy is necessary.

Food policy-makers and those attempting to influence them are a heterogeneous group of people including primarily representatives of many agencies within a government and representatives of civil society and private groups outside government. The process of making food policy is usually an inter-agency one, the head of state and the ministry of finance playing a key role in the allocation of public funds and the ministry of agriculture serving as the primary actor influencing production policies. Other agencies serve as the primary actors on consumption, distribution, and trade policies. These other agencies typically include ministries of health, commerce, trade, and environment, as well as departments that deal with drought relief and

rehabilitation. Sometimes non-government organizations (NGOs) and the public in general can be influential in food policy making. Macroeconomic policies may have profound effects on the rural-urban terms of trade and the structure of incentives for food and agricultural production.

The food policy of one country is often influenced by the policies (e.g., agricultural and trade policies) of other countries and international organizations. For example, developing countries sometimes resort to high tariffs as a coping strategy to deal with domestic agricultural subsidy policies in developed countries. Such inter-dependence in policy making often causes conflicts, as is exemplified by the highly confrontational positions taken on agriculture by developing and developed countries in agricultural trade negotiations. This has led to the creation and development of various international organizations. Key international actors in the food policy arena include the Food and Agricultural Organization (FAO), the World Bank, the International Monetary Fund (IMF), the Consultative Group on International Agricultural Research (CGIAR), the World Trade Organization (WTO), and the World Health Organization (WHO).[1]

The design and implementation of appropriate government policies for food systems depend on in-depth understanding of how the systems work and how they may be influenced by various policy measures. The case studies presented in these three volumes aim to help readers better understand the complexities of global, national, and local food systems and how the systems can be influenced by government policy and action by the private sector and civil society. Emphasis is on global food systems and food systems in developing countries. The cases are grounded in the principles of social entrepreneurship, an approach to the analysis, design, and implementation of action to improve food systems that involves hands-on, participatory training based on classroom presentations and discussions of cases of real policy-making situations within an analytical and conceptual learning environment.

[1]International food system governance is addressed further in chapters 9 and 10 of our forthcoming textbook and in the third volume of case studies.

The Social Entrepreneurship Approach as an Educational Tool

The literature defines social entrepreneurs and social entrepreneurship in various ways. We use the description provided by the Schwab Foundation: A social entrepreneur is "a pragmatic visionary who achieves large-scale, systemic, and significant social change through a new invention, a different approach, a rigorous application of known technologies or strategies, or a combination of these." Social entrepreneurship, then, is "about applying practical, innovative, and sustainable approaches that benefit society in general, with an emphasis on those who are marginalized and poor" and "a term that captures a unique approach to economic and social problems, an approach that cuts across sectors and disciplines." [2]

The term "social entrepreneur" is usually applied to individuals who design and implement programs with an immediate impact on specific population groups. Here it describes a mindset and a way to approach policy analysis, advice, and design, one that is well suited to the case study model. We believe that entrepreneurship education helps students become leaders, innovators, and creative problem solvers because it blends "real world experience with conceptual learning in the classroom." These volumes seek to help students develop these characteristics in order to simulate the real-world experience by bringing cases of real policy situations into the classroom.[3]

Social entrepreneurs have a social mission—in this case, to reduce poverty, hunger, and human misery in developing countries in a way that is sustainable over time. They see themselves as change agents, seeking to solve problems and exploit opportunities through innovative analysis and economically viable action by governments, the private sector, and civil society. They pursue action over rhetoric, and they focus on the creation of social value and public goods to compensate for market failures and poor people's inability to express their needs in terms of market demands. Policy recommendations made by

[2] http://www.schwabfound.org/whatis.

[3] Deborah H. Streeter, John P. Jaquette, Jr., and Kathryn Hovis, "University-wide Entrepreneurship Education: Alternative Models and Current Trends," Working Paper 2002-02 (Cornell University, Department of Applied Economics and Management, Ithaca, NY, 2002), p. 5.

the social entrepreneur (in this case, the student during and after the course) aim to change the underlying causes of problems, rather than the symptoms, by using new opportunities provided by modern science and technology, including molecular biology and digital technology, as well as new knowledge in the social sciences and opportunities offered by globalization. Building on the Schwab descriptions and material from several other institutions and individuals,[4] the cases emphasize these characteristics as integral to the social entrepreneurship approach.

By instilling social entrepreneurship thinking into your analyses, the cases encourage you to become a social entrepreneur or to use a social entrepreneurship approach in your future teaching and policy advice, design, and implementation.

The Cases

Each case is about a past, current, or expected future policy situation and is written by a professional with field experience relevant to the case. It focuses on a situation where policy alternatives exist and where policy lessons can be learned for use in future policy analysis, design, and implementation. The cases describe real policy-making environments and cover the key aspects of global food system policies, with an emphasis on food systems in developing countries. In addition to the necessary background information, each case presents policy issues and options, identifies the interests of each major stakeholder group, and provides an assignment to students.

These case studies are included in a three volume set that, together, cover policy aspects of the key components of the global food system from human health to international trade and macroeconomic policies. This volume contains cases related to domestic market, production, and natural resource management policies. Volume 1 contains cases related to health, nutrition, food security, and poverty policies and ethical issues. Volume 3 contains cases on macroeconomic and trade policies and institutions. The cases are numbered (in parentheses) to coincide with the chapters of an accompanying textbook (to be available in 2010). Chapters 1 and 2 of the textbook are on general policy issues and contain no case studies. The cases in this volume relate to chapters 6, 7, and 8 of the textbook.

By means of case studies published in the three volumes, as well as the textbook, the program aims to provide a comprehensive perspective of the role of government in the global food system with emphasis on developing countries and to strengthen university-level training to understand, analyze, advise, and make decisions about the system using an innovative, participatory approach.

Poorly functioning domestic food markets are a major barrier to reducing rural poverty and improving food security and nutrition in both rural and urban areas in many developing countries. At the same time, rapid changes in global and national food markets pose new challenges and opportunities to governments, farmers, and consumers. In Volume 2, chapters 1 (6-1) and 2 (6-2) focus on the increasing concentration in food marketing and the rapid spread of supermarkets, two important trends in food markets. Government action to facilitate market access by small farmers is of paramount importance for the future well-being of the rural poor. Chapters 3 (6-3), 4 (6-4), 5 (6-5), 6 (6-6), and 7 (6-7) identify critical policy issues related to market access and present policy options to be considered in various settings. One such option is price stabilization. The pros and cons of this intervention are analyzed in chapter 8 (6-8). The importance of rural infrastructure and related policy options are shown in chapter 9 (6-9), and chapter 10 (6-10) addresses a growing trend in farmers' markets and increasing demand for locally produced food.

Chapters 11 (7-1), 12 (7-2), 13 (7-3), 14 (7-4), and 16 (7-6) present policy issues, stakeholder groups, and policy options related to government interventions in food production to deal with poverty, famine, and food insecurity among low-income farmers, herders, and pastoralists in Sub-Saharan Africa. Risk management and the role of the government, which are of particular importance in the face of climate change and globalization, are addressed in chapter 15 (7-5). Chapter 17 (7-7) deals with land tenure policies. The policy implications of biofuel production are discussed in chapter 18 (7-8).

Assuring sustainability in current and future food systems is essential. Chapters 19 (8-1) and 20 (8-2)

[4] These sources include Ashoka, the Center for the Advancement of Social Entrepreneurship, the New Heroes, and the Kauffman Center for Entrepreneurial Leadership at Stanford University.

address soil degradation and conservation action from the perspectives of a nongovernmental organization (NGO) and the government, and chapter 22 (8-4) presents the key policy issues and options for sustainable use and allocation of water as well as the positions of various stakeholder groups. The interaction between human and ecological health is discussed in chapter 21 (8-3), along with a set of potential policy interventions.

The Classroom Activities

The cases and the textbook are designed to be used in a participatory social entrepreneurship teaching model. The social entrepreneurship thinking that will be promoted in the case analysis and discussion should be presented in a lecture during the first week of a course in which the cases are used, along with a set of guidelines on how to analyze the cases and prepare policy recommendations.

We would note that in our experience it is difficult to get full participation from all students in classes with more than 30 students.

A 50-minute class session may consist of a 15-minute presentation of a case and policy recommendations by a group of three students to whom the case was assigned at least one week before the class. Then a 25-minute general class discussion moderated by the instructor may follow, and the session may conclude with a 10-minute lecture that draws lessons from the case on the general topic being considered. For those cases where the assignment to students includes the development of recommendations for action by more than one stakeholder group, the three students may each present a stakeholder perspective for discussion in class. Further, to facilitate discussion and highlight stakeholder interests, the class may be divided into groups, each representing a stakeholder group in the general discussion. Each subtopic to be covered by cases will be introduced by the instructor in a lecture, which may be based on a chapter in the textbook. A 75-minute session would permit more discussion time.

Chapter One
Concentration in Agribusiness and Marketing: A Case Study of Arla Foods (6-1)

by Derek Baker and Kimmie Graber-Lützhøft

Executive Summary

The modern food industry is characterized by fewer and fewer firms and the emergence of some powerful international and global players. This case study of Arla Foods details that firm's development from its origins in local dairy cooperatives to its current position as a multinational food conglomerate. Its development has attracted scrutiny from competition authorities for a variety of reasons, and it raises questions about the role of farmer cooperatives locally, nationally, and internationally.

Some technical terms are examined in support of the case study: consolidation, concentration, and market power are often used interchangeably, but from an economic and policy perspective they are quite different and have a variety of origins. The case study also outlines some current policy concerns about horizontal and vertical relationships in food marketing chains. Arla exhibits a range of vertical and horizontal relationships with various sets of stakeholders, and their actual and potential interests are described and discussed in policy terms. Arla dominates its supply of raw material (milk), but its status as a cooperative would be expected to protect its farmer-suppliers. As Arla's influence has crossed borders through exports and collaboration with other firms in processing and distribution, other farmers may suffer, along with the dairy-processing firms to which they sell. As for other food processors, Arla faces powerful trading partners among Europe's retailers that have themselves attracted attention from policy makers.

In identifying and evaluating policy options, economists face a number of challenges, including variable definitions (of, for example, markets and products), difficulties in empirical measurement (particularly of market power), and modeling practices. Economic interests have shifted over time, and a "channel" orientation has developed in some food industries, changing the practices food industry firms use within those channels. Many such developments are difficult for policy to address, and this issue has relevance for Arla Foods.

Your assignment is to suggest policy recommendations for the various levels of government (local Danish and British governments, national Danish and Swedish governments, and the European Commission) regarding the future of Arla Foods and other large agribusiness firms. You will need to assess the extent of market power exercised by Arla and decide which stakeholders are likely to be affected by Arla's exercise of market power and in which ways.

Background

The number of food industry firms has declined across most commodity sectors and in most countries of the world. This decline has been widely associated with a presumed increase in the market power of the largest firms and with the abuse of that power. Owing to the public sentiments associated with such issues as the pursuit of profit, the price and availability of food, rural and village life, and farm incomes, market power in the food industry has been of considerable concern to policy makers. The connection between structural change in the food industry and the possible development and abuse of market power is, however, complex. This case study examines the forces at work, their potential impacts, and policy responses to them. Arla Foods is a Scandinavian food industry firm that has passed through various stages of growth to enjoy near monopoly-monopsony status and attracted the attention of the evolving regulatory environment in Scandinavia and Europe.

Consolidation and Concentration

In many countries the number of food industry firms has declined and the average size of firms has increased in a process known as consolidation (Baker 2003; Traill and Gilpin 1994; USDA 2002). As consolidation has proceeded, a few firms have increased market share more than the remaining firms through the process of concentration

(Rogers 2001). Economists' assumption of many small, price-taking firms might be maintained in the presence of some consolidation, as firms become somewhat larger but each still has an equal and negligible influence in the market. Concentration, however, delivers a small subset of very large firms with the potential to exert greater influence over prices and trading conditions than their smaller counterparts. Concentration has been shown to occur in both input markets and product markets and at all stages of the food marketing chain. "Concentration" is sometimes used interchangeably with "market power," whereas in fact neither term implies the other.

Theoretical and Empirical Issues

On the surface, measurement of consolidation may appear straightforward in that it entails tracking numbers of firms, whereas measurement of concentration seems more challenging because market shares must be derived. In fact, measurement of both can be difficult for both product markets and for the often overlooked markets within which inputs are purchased. The first measurement problem concerns product and market definition: large firms tend to purchase, produce, and sell many different products in a variety of forms, formats, and quality levels. The emerging dominance of nonspecialized retail formats (Stensrud 1999) has exacerbated this problem. A second problem confronts markets with significant volumes of international trade: calculating and interpreting a firm's domestic market share is complex if the firm sells in foreign markets or if the domestic market features many products produced by foreign firms. The third measurement problem involves interactions between products: a concentrated market for one product can have significant implications for related products that involve the same, or different, firms.

A fourth measurement problem is the identification of products within firms, and firms within markets. In the former case, vertical integration has the effect of reducing marketing volumes because at one or more points in the marketing chain products are not traded but retained within a single firm. In the latter case, associations between small firms may mimic the market power–related aspects of large firms, although the firms themselves each trade small volumes. A familiar example is the farmer cooperative, but equally significant is the agglomeration of retailers and/or wholesalers into "buyer groups" for the purposes of negotiations with suppliers (UK Competition Commission 2000). Finally, empirical measures of consolidation and concentration have almost always been used and interpreted with regard to product markets. These two processes are equally important, however, and perhaps even more influential, in input markets.

Misuse of market power is grounded in firms' restricting traded quantities in order to raise sales prices or reduce purchase prices. This understanding emerges from economic theory of monopoly and oligopoly and is at the core of a set of empirical techniques that seek to detect the influence of large firms' decisions and actions on the market. These techniques include direct approaches such as measuring or inferring differences between price and marginal cost ($P = MC$ in perfect competition) and finding a statistical association between market volumes and price that otherwise violates the competitive model. More crudely, measures of profit (or proxy measures) have been statistically associated with market volumes and specific known cost items. Less direct approaches involve observation of prices at different points in the food marketing chain over time and examination of the timing and extent of the transmission of price changes between stages. Observations of series of prices and market volumes have also been used in game theoretic models. Most of these methods seek to detect market power and its misuse at the market level rather than say anything about the actions of the individual firm.

The Forces at Work

Technology. Consolidation is likely to be partly attributable to technological change, both internal and external to the firm. Economies of scale often apply in cases of large investment items within the firm, like high-technology processing systems, information technology (particularly those that are bar code–based), packaging systems, logistics, and brand-based marketing. Economies of scale also apply to non–investment-related items such as promotion and market research. Technological forces external to the firm include the availability of reduced transport costs and rapid advances in information technologies.

Policy has also interacted with technology in the food industry. Regulation of food safety, environmental actions, and product labeling are likely to favor larger firms because they are better able to exercise economies of scale (Siebert et al. 2000).

These influences have increased market areas and reduced large firms' unit costs relative to those of small firms. Many such advantages apply first and foremost at the firm level, rather than at the level of the individual shop, processing plant, or warehouse, thus providing the incentives for the formation of chains without necessarily reducing the numbers of establishments (Marsden et al. 1998).

Consumer Habits. At the retail level, consumer shopping habits have changed to reflect changing lifestyles and income, as well as transport availability and changing dietary preferences (Kinsey and Senauer 1996). Changing consumer habits have invoked changes in both the format and degree of specialization of shops. In many countries specialized shops have given way to nonspecialized stores, and mall-type retail clusters have appeared. With the growth in the importance of nonspecialized shops, the measurement of retail-level variables such as concentration, costs, and profits has become impossible for researchers and regulatory authorities.

Demand for information by consumers has led to substantial pressure on food industry firms to create systems and services that can measure, process, and deliver information to the consumer. Labeling and test certification address the content of foods, and identity preservation ("traceability") and process certification address the path taken by the product. In both cases, it is likely that large firms with large volumes can better serve the customer than their smaller competitors.

Channel Development. Consolidation and concentration have fostered linkages downstream toward retailers and upstream toward farmers so that a smaller number of channels to the consumer are available. The emergence of channels has led to new practices between agents in the food marketing chain, particularly long-term contracts featuring rigorous application of privately specified standards (Hughes 2002). In the context of market power, channel practices may favor the emergence of "chain captains" (Connor 2003) who, although they are active at just one stage of the chain, manage to control, and possibly exploit, agents at all stages of the chain. The predisposing conditions for channel captaincy have been referred to as "food convergence" (Cotterill 1997) and have been recognized in two forms, both of which are associated with the modern use of marketing techniques that feature brands:

- The "U.S. model" of food convergence features food processors as chain captains. Market power is exercised by supply of globally or nationally well-known brands without which no supermarket can operate.
- The "British model" emphasizes retail power, exercised by restricted access to supermarket shelf space, downward pressure on prices paid to suppliers, and the use of retailers' own-label brands in competition with processors' brands.

The implications of food convergence generally arise from the smaller number of market participants and their close vertical linkages in the food chain. Such linkages allow not only for supply contracts, but also for provision of large amounts of information. This situation enables traceability and differentiation of products according to issues such as animal housing conditions or crops' pesticide history, and for specification of features such as packaging and timing for delivery.

Mergers. Mergers and acquisitions, which occur as firms that have increased their market share are purchased and combined with other "winning" firms, have acted as driving forces in food industry consolidation. Wrigley (2001) notes that merger activity increased among food retailers in Britain in the 1980s and 1990s and followed in the United States in the late 1990s. Wrigley (1997) rejects the concept of separate British and U.S. models of food convergence. Instead, he identifies several factors determining the intercontinental difference, particularly the policy environment, the availability of venture capital, applications in information technologies, and the entry of Wal-Mart into food retailing. Several commentators have noted the increasing number of cross-border mergers in the food industry (see, for example, UK Competition Commission 2000), and this phenomenon is reflected in this case study of Arla.

Vertical Integration. Vertical integration in the food industry has been examined in many contexts—specifically, farming and processing, processing and distribution, distribution and retailing, and processing and retailing. Reasons behind vertical integration include overcoming difficulties in acquiring and processing information (Hennessy 1996), reducing the cost or awkwardness of transactions (Azzam 1996), and enhancing the compatibility of technologies and scale between

upstream and downstream stages of the food marketing chain.

Social Change. At the farm level, reduced numbers of farms and increases in farm size have been accompanied by greater and more widespread specialization and an increasing tendency for farmers to be employed off the farm (Brouwer and Bijman 2001). In general, consolidation of farms has not been viewed as a competition-related issue. In some commodity sectors, however, contracting and other transaction mechanisms have been used to effect significant local concentration and raise concerns about market access. In Western economies, pork and poultry production provide examples. In an African and Latin American context, contract production of flowers and vegetables for multinational food industry firms has also been criticized for dominating and marginalizing traditional producers.

Urban Location. Location of establishments has played a role, as the growth in the size of retail stores and processing plants has meant that an increasing number of locations are capable of sustaining just one establishment. Indeed, control of potential sites for retail food stores outside British towns has itself become the subject of anti-monopoly action (UK Competition Commission 2000).

Innovation. Innovation is thought to be related to market concentration, although opinions vary about the nature of the relationship. According to some researchers and theorists, perfectly competitive markets would not offer sufficient returns to firms to justify the costs incurred in innovation (Braadland 2000). This view particularly refers to new product development in the context of price-taking firms. The alternative view is that a monopoly provides no incentive for innovation owing to lack of competition (Harris 2002). Product differentiation and new product development are apparent on the supermarket shelves, although the extent to which this innovation is greater or less than it would be in a non-concentrated food industry has not been adequately researched.

Manifestations of Market Power

Economists' approach to market power in the food industry has traditionally focused on the impact of monopoly actions on the consumer. Real food prices paid by consumers have continued to fall in most developed markets, however, and little evidence of monopoly-related welfare loss to consumers has appeared (Hyde and Perloff 1998; Kinsey 2003; Park and Weliwheta 1996). A more recent focus has been on the body of the food chain, particularly the transactions between processors, distributors, and retailers.

Retail Behavior. Retailers' behavior toward suppliers has attracted considerable recent attention. A variety of tests have been employed for monopsony action whereby retailers limit the volume they demand to drive prices downward. Economic modeling centered on methods developed in the "new empirical industrial organization" approach has yielded tests for monopoly and monopsony simultaneously (for a review see Digal and Ahmadi-Esfahani 2002). As already noted, such studies employ market-level data and do not deal directly with single firms' conduct.

Specific actions by retailers toward suppliers have come under scrutiny in the context of retailers as "gatekeepers" owing to their apparent control of the interface between consumers and the rest of the food industry (UK Competition Commission 2000). There are many examples of such actions (see also McCorriston and Sheldon 1997; OECD 1999). Among other things, retailers

- pass on to suppliers the costs of new retail product introduction (such as initial advertising costs);
- demand payments from processors for access to supermarket shelf space (known as "slotting fees");
- price some basic products below cost to increase sales of complementary high-margin products ("loss-leading");
- require agreements with suppliers to be on an all-or-nothing basis across a range of products (so-called "de-listing threat");
- require compensation from suppliers for products' commercial failure;
- require suppliers to play technical roles (such as physical stocking of shelves);
- demand exclusive supply agreements; and
- require coordination with retailers' use of own-label brands.

Retailers' use of own-label brands is not generally thought of as a direct consequence of concentration, but it is clearly enabled by retailers' scale and

their desire to add value in terms of shoppers' desire for convenience. The extent to which retailers exploit food-processing firms that supply their own-label brand products is not clear.

A key element of food retailers' strategies is their location within a catchment of customers. Several locational trends have been observed, including moves outside town centers and location within shopping malls, often in combination. Owing to the limited number of suitable ("greenfield") sites, retailers have the incentive to purchase or occupy as many sites as possible, not only to open a store, but also to prevent entry by a rival food retailer.

Processing. Most early studies of food processors' market power focused on the U.S. meat industry, particularly the measurement of the market power of processors and how they exercised it over retailers on the one hand (for example, Morrison 2001) and feedlot owners on the other (for example, Schroeter and Azzam 1990).

According to the "food convergence" line of reasoning, food processors' must-stock brands are supplied to retailers under monopoly conditions. The most obvious abuse of this position would be restriction of supply to drive up wholesale prices. A range of other practices has been proposed, however, including "tying" of must-stock brands to other products the processor sells and exclusivity arrangements.

Logistics and distribution have also been employed in exercising market power. In some cases processors have supplied bulk containers, chillers and freezers, and display cases to retailers with the requirement that retailers use these items to handle, store, or display only that processor's products.

Researchers have examined the subject of brands as an instrument of market power in some depth and detail for the case of breakfast cereals in the United States. Connor (1999) observes that the industry supplying such products is highly concentrated, and the few firms in the market own a very large number of brands. Connor argues that this situation is anti-competitive because it raises barriers to entry, as potential new entrants face incumbent brands at all sites within the "product space" despite the non-profitability of most of those incumbent brands.

Processors' relations with retailers clearly vary from product to product. In the case of retail beer in Britain, firms in the highly concentrated brewing industry own a large proportion of the pubs. These pubs are commonly leased to agents under a set of arrangements that have been criticized for their pricing practices, exclusivity of product supply and tying, and constraints on lessees' management freedom (UK Monopolies and Mergers Commission 1989).

The concept of exploitation of farmers by monopsonistic food processors and buyers is an old theme. Collusive arrangements have been portrayed as the main instrument of placing downward pressure on the prices received by farmers. Other potential instruments include

- processor control of key inputs (like water, transport, credit, seeds);
- tying of input supply to purchase of products; and
- requirement for purchase of high-investment items on the farm (such as pipe sizes for milk collection that are not compatible with rival buyers' equipment).

Farmer Cooperatives. One of the main justifications for farmer cooperation is the accumulation of countervailing market power against the potential monopsonistic actions of processors and other buyers at the farm gate. The essential nature of a cooperative is a consolidation of product (or input, or service) from many farmer-members. The exclusion of nonmember suppliers and the requirement that members sell exclusively to the cooperative has been interpreted in some contexts as anticompetitive.

In the meat and dairy industries, many processors are vertically integrated farmer cooperatives. These cooperatives operate as large food processors and employ the full range of sophisticated processing and marketing techniques. In recent decades the trend in most countries has been toward consolidation of cooperatives. In some cases single cooperatives now approach 100 percent shares in milk and livestock purchases, perhaps spanning more than one country. Aside from concerns about monopoly and monopsony behavior, such concentration presents a barrier to entry by other firms. Many of these concerns have been raised with regard to Arla Foods.

Single Seller Desks. In some countries national-level agencies have been assigned a state-authorized monopoly in marketing export products. The objective is usually related to farm income, but the procedure faces criticism from some circles as a market distortion. The argument runs that the monopsony and monopoly status of these agencies removes their incentive to supply products into differentiated markets. Obviously, the most strident opposition to single selling desks comes from independent traders that are excluded from the market.

Input Suppliers. Suppliers of farm inputs, animal feeds, and feed and food ingredients often operate in highly concentrated industries. The extent to which they exercise monopoly power over their customers has not been studied in detail, but this concern lies at the heart of concerns over patenting and other intellectual property attached to products or components based on living organisms.

Case Study: Arla Foods

Arla Foods is a cooperative owned by 10,000 Danish and Swedish dairy farmers. Including its 84 subsidiaries (as of September 2005), it is Europe's second-largest dairy company, with milk purchases of 8.4 billion kilograms and DKK 46 billion sales in fiscal year 2004/05 (Arla Foods 2006a, b). It was formed in 2000 by the merger of two dairy cooperatives: MD Foods (Danish) and Arla (Swedish). The stated purpose of the merger was to match and counter the size of the large international retailing chains that were, and remain, its customer base. MD Foods had a long history of growth by merger with other cooperatives as far back as 1970 and including the 1999 merger with the then second-largest dairy cooperative, Kløver Mælk. Foreign acquisition was also a longstanding feature of MD's strategy, beginning with the purchase of Associated Fresh Foods (the United Kingdom's fifth-largest dairy company) in 1990. At the merger in 2000, MD Foods purchased 90 percent of all Danish cows' milk, and Arla, some 65 percent of Sweden's.

As a result of rising imports of cheaper German milk, Arla's share of the Danish liquid milk market fell from 89 percent in 2003 to 80 percent in 2006. It has been suggested that Arla's market share has also suffered owing to consumer reaction to recent legal action over its abuse of dominant market position (*Food and Drink Europe* 2006). Arla still holds a large market share in Denmark for most dairy products, including yogurt (75 percent), cheese (55 percent), and all organic dairy products (75 percent). The United Kingdom, however, is the group's biggest market, accounting for 33 percent of company sales, followed by Denmark (22 percent) and Sweden (19 percent). Arla's UK subsidiary (Arla Foods plc, formed in 2003 through a merger with Express Dairies) is that country's largest supplier of liquid milk. Outside Denmark, Sweden, and the United Kingdom, Arla Foods operates numerous subsidiaries, with production facilities in Argentina, Brazil, Poland, and Saudi Arabia and licensed production in Canada and the United States.

Arla Foods spans the full range of dairy products, including liquid milk (45 percent of turnover), cheese (25 percent), powder and preserved milk products (14 percent), and butter and spreads (11 percent). Strong brand names are employed, including Lurpak (originally Danish, but now the United Kingdom's leading butter brand), Rosenborg mold cheeses, Buko cream cheeses, and DANO full-fat powdered products (with substantial market share in Asian and Middle Eastern markets). Through a number of subsidiary companies, Arla markets fruit juices and other beverages, bacterial cultures, and food ingredients. In the United Kingdom, Arla Foods has a partnership with Fonterra (a New Zealand dairy company, also cooperative-based) for packaging and distribution of butter and other spreadables that uses Fonterra's Anchor brand. For import and distribution on the Chinese market, Arla Foods has a joint venture with Mengnui (China's leading dairy company). In addition to its branded product range, Arla produces retailers' own-label branded products.

Both Arla Foods and its predecessor entities faced scrutiny from Swedish competition authorities during the series of mergers that led to the current corporate arrangements (Danish Competition Authority 2000b; OECD 2004). The 1999 merger of MD Foods and Kløver Mælk was subject to the following requirements of the Danish Competition Authority (Danish Competition Authority 1999, 2000a, 2004a, b):

- Farmers' level of choice was to be enhanced by reducing the duration of the supply commitment and permitting farmers to supply up to 20 percent to other buyers.

- All competitors were to be permitted to purchase raw milk and cream from MD Foods, and the company was obliged to buy excess milk from other Danish dairies.
- MD Foods was required to divest itself of annual processing capacity of 180 million kilograms of milk (entailing sale of a specified subsidiary company to a Danish competitor).
- MD Foods was prohibited from real estate arrangements that restricted entry by prohibition of use of land or facilities in dairy processing.
- MD Foods was compelled to allow competitors' access to distribution facilities.

Notably, the conditions imposed on MD Foods were not backed up by specified penalties for noncompliance. The Danish Minister for Commerce and Industry imposed several restrictions on MD Foods and the new conglomerate Arla Foods but did not refer to case to European Union (EU) Competition Authorities (Danish Competition Authority 2000a). The summary of the situation given by the Organization for Economic Cooperation and Development (OECD) was that Denmark lacked an appropriate legal framework to deal with the case (OECD 2004). Although Swedish competition authorities had previously prevented Arla's mergers with other Swedish cooperatives (Eurofood 2000), they too gave an affirmative final judgment on the merger with MD Foods. The following strictures were imposed (Danish Competition Authority 2004a):

- further MD Foods divestiture of processing capacity to competitors;
- Arla Foods' provision for competitors' access to Arla Foods' distribution system; and
- Arla Foods' commitment to selling or buying milk and cream to and from other dairies.

The merger between Arla Foods and Express Dairies was referred to the European Commission, which concluded that the merger did not threaten to create, or reinforce, a dominant market position with regard to raw milk. The merger was also dependent on a general meeting of Express Dairies' shareholders in April 2003. The European Commission referred the matter to the competition authorities in seven countries in which the merger may have threatened competition regarding processed dairy products (European Commission 2003). The UK competition authorities concluded that there was no threat to the public interest, and the deal was approved by the United Kingdom's Office of Fair Trading. Notably, the UK regulator stated that the market power of retailers in the UK was sufficient to offset the effects of the merger (UK Competition Commission 2003).

In late 2006 Arla Foods acquired 30 percent of the Finnish dairy company Ingman Foods, with an option on the balance of shares. This action received approval from EU competition authorities (Arla Foods 2007).

In 2002 EU competition authorities approved a joint venture between Arla Foods' packaging subsidiary (Danapak), the Austrian Teich Aktiengesellschaft Partnership, and Danish Corona Packaging. This joint venture created one of Northern Europe's largest manufacturers of flexible packaging (Arla Foods 2002). The European Commission concluded that because of the many end uses of flexible packaging (that is, not just for dairy products), there was no risk of emergence of a dominant position for the new firm (European Commission 2002).

In a Danish court decision of February 10, 2006, Arla Foods was fined DKK 5 million for abuse of a dominant position in fresh milk and fermented products under the Danish Competition Act of 2002 (Danish Competition Authority 2006a). Arla had agreed to pay its (retailer) customer Metro to exclude the products of Arla's competitor Hirtshals Andelsmejeri. Although Arla denies any wrongdoing (Arla Foods 2006c), the court received evidence that Metro revoked its contract with Hirtshals in association with Arla's financial contribution to Metro's 40th anniversary celebrations. This decision marked the first time a Danish court concluded that a company abused a dominant position. A later confidential settlement between the two firms was reached, involving a payment from Arla to Hirtshals (Arla Foods 2006d).

Until 2004 Arla Foods charged new dairy supplier-members an entry fee equal to 2 percent of the value (at basic price) of milk to be supplied. Three Danish dairy farmers brought this matter to the

Danish court, alleging abuse of a dominant position. In August 2002 the Danish Competition Authority ruled that Arla Foods had abused its dominant position in procurement of Danish cows' milk, on the grounds that the fee exceeded fair compensation to Arla for the costs of admission. In November 2003 the Danish Competition Appeals Tribunal overturned the decision, finding that it had not contained sufficient description and analysis of the salient facts. Furthermore, the Appeals Tribunal stated that a high fee alone does not constitute evidence of abuse of a dominant position. The farmers took the case to the Danish High Court, which dismissed it in September 2006 (Danish Competition Authority 2006b).

In 2004 the Danish Competition Authority concluded that the series of mergers between, first, Kløver Mælk and MD Foods, and later MD Foods and Arla, had led to higher Danish milk prices than would otherwise have prevailed. The authority stated that under the current legal regime the mergers would probably not have been permitted (Danish Competition Authority 2004b, 284). Further concerns have arisen over Arla's market power as a supplier to retailers and as a distributor of other firms' products to retailers (Danish Competition Authority 2004b, Chapter 5), but in several instances Arla was found not to have abused its dominant position, particularly with regard to pricing and marketing support in dealing with retailers (Danish Competition Authority 2002).

Policy Issues

General Comments

The primary policy concerns provoked by concentration in the food industry are the protection, promotion, and preservation of competition. Most countries feature two forms of policy:

- antimonopoly policy targets firms' pricing and practices that exercise market power; and
- antitrust policy addresses relations among firms, to prevent or punish mergers and other forms of association that provide for the exercise of market power.

Increasing consolidation and concentration has led to a shift in policy interest away from monopoly and toward a balance of market power between stages of the marketing chain. This shift is not new: U.S. law has allowed farmers' collusive actions (such as in a cooperative) to enable "countervailing market power" (relative to that of the large food processors to whom the farmers sell) as far back as the Capper-Volstead Act of 1922. This vertically oriented interest in bilateral market power has recently extended to relationships between retailers and other stages of the food marketing chain.

Policy concern about access to markets, which is traditionally protected by antitrust policy that prohibits collusion and exclusivity agreements, has been transformed into concern over access to channels. Food convergence means that fewer channels are available to firms, and access to these channels is often predicated upon adherence to quality standards, information provision, or other actions by suppliers. A further complicating feature is that channel trade tends to be driven by contracts rather than interactions in a transparent market. This situation limits the extent to which policy agencies can monitor trading conditions.

To the extent that channel access and food convergence require and result in specialization on the farm, then concentration can be associated with farmers' risk management. The ageless risk-related practice of diversification must then be abandoned, and policy makers must ensure that alternative mechanisms are available.

Channel access requisites such as standards, product descriptions, food safety, information provision, certification, labor arrangements, animal welfare, and political (and even religious) commitments are, to one degree or another, parallel requirements to those of most governments. They are defined and imposed by private agents, however, which challenges traditional thinking about the role of government and private enterprise. Currently there are few indications of which, if any, within-channel practices actually discourage entry or otherwise exclude entry by farmers on a noncompetitive basis. While farmers that gain channel access can certainly benefit from it, they have the incentive to minimize the number of other farmers that benefit alongside them.

The gatekeeping role of retailers gives rise to several concerns. First, as the controllers of supermarket shelf space, retailers effectively determine the range and form of products on sale. In addition, retailers' own-label brands compete for shelf space and in most countries have steadily accumulated market share. Consumer groups have raised

concerns over the possible decline in product variety, specifically a reduced number of brands on sale and the disappearance of local or traditional brands from the market. That tendency is exacerbated by supermarkets' increasing sales of nonfood items and ready-to-eat foods, which are recognized as the fast-growing market segments. Many authors have observed the decline of "second-tier" brands, possibly as a consequence of these trends.

As old brands and products disappear from shop shelves, a second set of gatekeeping concerns addresses the appearance of new ones. Several authors have made the case that some actions of retailers hamper new product introduction. In the view of some, slotting fees (and other costs of product introduction that are passed back by retailers) are simply barriers to entry. Still, a plausible economic argument can be made that such costs are compensation to retailers for the risk taken when a new, and possibly unsuccessful, product takes shelf space from an existing product of known performance.

In many countries, policy makers resolve to support, assist, and promote small and medium-sized firms. Some food-related policies are less demanding of small firms than large ones, but many instruments of other policies (like food safety and environmental protection policies) demand high levels of capital and specialist labor, which large firms are clearly more able to provide than small ones. Where policies address the firm rather than the individual factory or site, then the case has been made that regulation encourages concentration by way of merger and acquisition. The fact that some mergers and acquisitions cross borders accentuates the concern that new entrants, particularly retailers, will bring their suppliers with them and supplant domestic suppliers or force lower price regimes onto them.

In all countries, farmer cooperatives operate under selective policies that provide certain advantages over other agribusiness firms. Commercial advantages include allowing income to be treated as nontaxable until distributed to members and exempting transactions between suppliers and the cooperative from most taxes. In terms of competition policy, cooperatives are commonly allowed to approach monopoly status in raw material purchase, product sales, and export supplies. At the farm level, this monopoly status is implemented through supplier contracts featuring exclusivity clauses that would be illegal in other commercial settings. It should be noted that such treatment of cooperatives is not necessarily the preserve of so-called cooperative law, as many countries featuring a powerful cooperative movement lack any such a law. In such cases the laws governing commerce can accommodate the cooperative business model.

The role played by food processing and other agribusiness in rural society is an area of current research. There is a widespread belief that agribusiness is a significant employer in rural areas and a means of retaining added value in the region in which it is added. Concentration means that fewer firms are making fewer decisions about where to locate, so that much of relevant rural development policy is now concerned with presenting and promoting potential locations to agribusiness firms. In turn, this effort to promote location of agribusinesses in certain areas interfaces with policies such as transport and local taxation (which might encourage location) and preservation of rural landscapes, residents' protection from smells and noise, and heavy transport bans (which are designed for the opposite effect).

Protection of the countryside from retail greenfield development finds some common cause with small business owners in the "high streets" of towns and small cities. Retail facilities outside small towns take business, and businesses, away from these traditional locations. Where powerful retail firms have already purchased suitable land areas, then zoning and municipal planning responses may (1) be too late and (2) support the implied market power by restricting other firms' location options.

Policy Issues Surrounding Arla Foods

Arla Foods operates as a near monopoly, and a near monopsony, in Denmark and Sweden and maintains a dominant position in Britain. It has achieved this position through a process of mergers among cooperatives (in the Scandinavian countries) and joint ventures, partnerships, and mergers with other organizations elsewhere. Competition authorities have, at various stages in Arla's development, reviewed these various mergers, partnerships, and acquisitions to ensure that society's best interests were being preserved. In practice this oversight has involved examining merger plans and requiring certain actions of the parties to the merger that would maintain competition.

Because Arla is a cooperative and is, to some extent, vertically integrated, some of the supplier-

buyer policy issues do not arise. A cooperative is required, however, to operate according to its constitution, which usually means farmer-member governance and influence over strategy, as well as generation of benefits to member-suppliers. Some Arla members have brought actions against Arla concerning its entry fees (which are now discontinued). The policy issue is whether or not Arla employs its near monopsony status to extract higher entry fees than would be possible were a number of competing buyers of milk available.

Close associations with a supplier of auxiliary services (packaging) have also come under scrutiny. The policy issue is the extent to which Arla's ownership and control of dominant auxiliary firms prevent other firms from accessing similar products.

Arla is reported to have been found guilty of imposing exclusivity on a retail customer, at the expense of a rival supplier. Here, the policy issue is that the consumer's interest is best served by having products from numerous dairy processors on the shelves of as many retail shops as possible. Arla's actions not only prevented that outcome, but also deprived a competitor of a market for its products, thus inflicting financial damage on its farmer-suppliers.

It is notable that Arla produces own-label branded products for retail customers—particularly in the United Kingdom—alongside its own heavily brand-oriented marketing activities. This fact suggests that Arla exerts limited market power over retailers, despite its substantial market share.

Stakeholders

In the context of concentration in the food industry, stakeholders obviously include the members of the food marketing chain, consumers, and taxpayers, who fund and benefit from the regulatory process. Within the food marketing chain, several spectra of interests exist that span ownership (as opposed to employment), sentiment, tradition, and ethics.

Less obvious connections extend to rural residents, users of shared resources (such as roads and water supplies), and pressure groups with a single agenda (such as anti–genetic modification or pro-organic) or multiple ones (such as quality of rural life or various animal welfare concerns).

A number of stakeholders are associated with Arla Foods. Consumers in many countries are stakeholders in any change in Arla Foods' competitive position. This situation particularly applies to Denmark and Sweden, where few alternatives to Arla's products exist; the position in the United Kingdom is somewhat less extreme.

Scandinavian dairy farmers are stakeholders in Arla's development. Farmers within Arla have a financial stake in Arla's profitability, no matter what means are used to bring it about. Arla's existing members also have a stake in defending their benefits, so that if volumes of sales were static, they would have an incentive to prevent other farmers from joining. Farmers who are not suppliers to Arla have a stake in maintaining competition because they require continued access to processing firms and to retail buyers of processed products. Farmers wishing to join Arla have a stake in ensuring that no barriers to entry exist.

Farmers in foreign countries have seen their own dairy-processing operations (whether cooperative or private) face competition from Arla, with the likely consequence of damage to milk prices. As one consequence, local dairy processing firms may be forced out of production of the most profitable dairy products and left with less lucrative alternatives.

Retail buyers of dairy products have a stake in secure access to high-quality products at competitive prices. In addition, retailers would prefer to offer consumers a choice from their shelves.

Rural communities are stakeholders in agro-industrial change. Small, independent processing firms (including cooperatives) provide different kinds of employment and economic contributions than do large, vertically integrated organizations such as Arla. Given that Arla has supplanted almost all small dairy-processing plants in Denmark, that country's rural communities have had to adjust, and that adjustment has produced winners and losers.

Policy Options

The most obvious policy option available to regulators of Arla is scrutiny, entailing monitoring of

- mergers, takeovers, acquisitions, and joint ventures;
- pricing;
- complaints and legal actions; and
- adherence to the cooperative constitution and relevant laws.

In dealing with such a persistent, dominant market force, policy makers might move to limit Arla's market share in the event of any new proposed mergers and acquisitions. Such a step would require legislators to define a maximum allowable market share and then defend that definition. Several complicating factors would also arise: Should market share be defined over the EU as a whole (it is politically defined as a "single market") or just for the three markets in which dominance is clear? Should market share be defined over all dairy products or just certain ones?

If Arla manages to increase its market share by increasing sales, without mergers and acquisitions, regulators have few options. An alternative, however, lies in the regulation of retailers. Retailers are already prohibited from exercising exclusivity in sourcing, and this prohibition may provide an opportunity to constrain Arla's market share, particularly if Arla is prohibited from acquiring competing firms. Contracts and other transactions might be regulated to prohibit product-tying arrangements (requiring supply of one product with another), exclusivity of infrastructure and hardware, collaborative pricing arrangements, and other issues between Arla and its retail customers. Such policies may prove difficult to implement because compliance is difficult to ensure.

In the past, large, vertically integrated cooperatives have justified their size and influence as a counterweight to large and powerful retailers. Any policy steps taken to reduce Arla's ability to act as a counterweight to retailers would (1) face some well-founded and popular opposition and (2) require compensation of farmers that might exceed benefits to consumers.

Another approach may be to prohibit Arla from operating in markets related to the ones in which it has achieved dominance. Arla might be excluded, for example, from markets for protein fractions, ice cream, or milk powder. Such an approach would require sales of Arla's by-products to competing firms, which would then be able to maintain a presence in the dairy industry in order to challenge Arla in the future.

In an extreme response, policy makers might require Arla to be broken up into separate and competing firms. This approach would be a technical challenge and would need to be formulated and implemented in a manner that did not disrupt supplies from farms and processors. The breakup might be regional, vertical (for example, involving separation of stages of processing and distribution), or market-by-market in a product sense.

Arla's dominance in Denmark and Sweden is strongest as a buyer of raw milk: it is a virtual monopsonist. This outcome has largely arisen, and been tolerated, because Arla is a cooperative. Future policy will need to examine whether cooperatives should be allowed to become monopsonists (which then eases their progress toward monopoly). At present, policy treatment of cooperatives is poorly equipped to deal with such problems: Denmark has no cooperative law as such but makes provisions for cooperatives through their adherence to aspects of their own constitutions. Policies could, however, restrict the length of Arla's contracts with suppliers or remove its exclusivity with individual farmers. The EU has not yet developed a policy or legal construct for dealing with market dominance by cooperatives. Most arguments in favor of cooperatives as defenders of farmers break down when the cooperative markets its products across borders to the detriment of foreign farmers.

More general policy options are also available to encourage rivalry with Arla. These options include supporting or subsidizing innovation, local employment, product promotion and market research and investing in value-adding activities. These instruments largely fall within regional development policy or support to science and industrial development. It should be noted that Arla cannot generally be excluded from taking advantage of such incentives, which may have the effect of reinforcing its dominant position. A possible exception is in policies targeted at small and medium-sized enterprises or those located in specified locations. Such an exception would be effective in countering Arla's dominance only

where (1) a subsidiary of Arla was not eligible and (2) the eligible firms had sufficient size to take advantage of the opportunities offered on a national scale.

Governments are significant buyers of dairy products through their ownership of hospitals, schools, prisons, and other state facilities. Governments could encourage competitors to Arla by awarding supply contracts to them instead of to Arla. Implementing such a policy would require support from local authorities, many of whom operate competitive tendering arrangements and would be loathe to favor a high-priced bid over a low one. In rural areas, local state facilities like hospitals and schools serve the families of farmers who may be suppliers to Arla and so object to its exclusion from their local market. In the long run, such farmers might be viewed as potential sources of milk for competing firms, but defections from Arla are not likely to occur in regional blocs that would provide a competitor with easy market entry.

Assignment

Your assignment is to suggest policy recommendations for the various levels of government (local Danish and British governments, national Danish and Swedish governments, and the European Commission) regarding the future of Arla and other large agribusiness firms. Assess the extent of market power exercised by Arla, and decide which stakeholders are likely to be affected by Arla's exercise of market power in which ways.

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Chapter Two
A Revolution in the Making: The Case of Agro-Food Retailing in India (6-2)
by Sudha Narayanan

Executive Summary

Recent discussions of global agro-food systems have turned the spotlight on food retailing. Observers concur that globalization has been accompanied by, and may have aided, retail concentration in agro-food markets. This transformation, especially in developing countries, has been nothing short of a revolution.

Until now, India has been conspicuous as an exception to the rule. Only around 2 percent of all retail trade in India is in the organized sector. The food retail sector is likely even more fragmented and continues to be a complex mosaic of diverse small-scale actors, including itinerant vendors, government outlets, cooperative markets, and small-scale corner stores.

This fragmented retail sector was attributable in large part to the policy framework. So far, foreign direct investment (FDI), a critical driver of retail transformation in other countries, has been disallowed in the retail sector. Laws putting ceilings on urban land use limit the physical space available to giant retail stores. In addition, domestic trade in agricultural produce was tightly regulated. Post-harvest practices related to storage and transportation, as well as logistical bottlenecks, have also stood in the way of large-scale investments in the sector. Yet these factors might be changing now. Growing urban consumerism and the rise of a newly wealthy professional middle class that values shopping experience and convenience have spurred a growth in demand for processed and branded ready-to-eat convenience foods. In the absence of FDI, domestic businesses have responded powerfully to this demand and intensified their focus on food retailing. Meanwhile, with India ranked the top destination for global retail investment for the second consecutive year, multinationals are seeking ways, other than FDI, to enter the Indian market.

Advocates enthuse, rightly, over the efficiencies that large-scale investments would bring. At the same time, there is considerable concern that the emergence of supermarkets, especially if it leads to retail concentration, might have distressing implications for a large constituency of poor actors along the entire chain—small and poor farmers, informal traders, and retailers, as well as poorer consumers. Retail transformation raises important questions about the relative position of farmers in the supply chain. Although consumers are the presumed beneficiaries of supermarkets, because of improvements in quality, safety, and choice, it is not clear if supermarkets will be able to serve the poorer segments of the population. As for small traders, the emergence of large-scale retailers with deep pockets could dismantle their livelihoods if they succeed in weaning away small traders' clientele. In short, it is not clear if supermarkets will be part of a solution to poverty or part of the problem.

Clearly, two issues merit careful scrutiny. First, how will the efficiency gains from this transformation be distributed across actors? Second, what is the nature of costs associated with the displacement of livelihoods that such a transformation would entail? Given these considerations, should the government enable or aid such a transformation by reconfiguring domestic policies and opening up FDI in retailing?

Your assignment is to recommend to the Government of India a set of policies to be pursued to guide future developments in the food retail sector, taking into account the interests of the different stakeholder groups.

Background

The Global Context

Recent discussion of global agro-food systems has turned the spotlight on food retailing, and with good reason. There is widespread agreement today that across the developing world, retail sector transformation is spearheading fundamental changes in food systems and that these changes

have happened with stunning rapidity, often within the span of a decade.

Consider this. In the 1980s there were few large-scale food retailers and almost no supermarkets[1] in most developing countries. By 2002, supermarkets claimed close to two-thirds of the share of food sales in parts of Latin America; more than half in East and Southeast Asia, Central Europe, and South Africa; and almost a fifth in countries such as China. In fact, in China food retailing was completely controlled by the government until 1990, and there were no supermarkets. By 2003, supermarkets accounted for 30 percent of the urban food market share, and their sales revenue is growing at 30–40 percent a year—faster than in most other developing countries (Hu et al. 2004). Some Latin American countries offer similarly dramatic examples. In Argentina, supermarkets' share of retail food sales was 60 percent by 2003; in Brazil, 75 percent. These figures are close to the 75–80 percent share in the United States and France. Remarkably, what took five decades to happen in the United States has taken a mere decade in these countries (Reardon 2006).

It is interesting too that this transformation of the agro-food marketing chain has come in waves across the regions through a spatial diffusion that mimics the "flying geese" phenomenon.[2] It started with the richer countries in Latin America during the early 1990s. Next, came East and Southeast Asia and Central Europe. The third wave, in the late 1990s and after, hit the poorer, smaller countries of Central America and Southeast Asia, as well as Southern and then Eastern Africa. By 2003, the share of supermarkets in food retail sales in Taiwan and the Czech Republic had reached 55 percent. Similarly, in Chile, Costa Rica, the Philippines, South Africa, and Thailand, supermarkets were capturing half of the food retail market in 2003. The fourth wave, which has only just begun, is in the poorer countries of South Asia and West Africa.

The idea of such a change is not new. Historical experience suggests that as countries develop, markets transform from fragmented local markets to larger centralized markets. This process typically originates in the dry goods sector before encompassing fresh produce, including fruits, vegetables, and dairy.[3] Yet in terms of speed and transformative power, what developing countries are experiencing today is nothing short of a revolution. In particular, this transformation has taken an unfamiliar path because it is grafted onto agrarian systems that have often not made the transition to "modernized" industrial agriculture. It is also taking place in the context of immense poverty and deprivation. In 2001 as much as 21 percent of the population in developing countries lived in "extreme" poverty, on less than US$1 a day (World Bank 2004). Supermarkets are apparently no longer a rich-country phenomenon. There is hence considerable concern that the emergence of supermarkets, especially if it leads to retail concentration, might have distressing implications for a large constituency of poor actors along the entire chain, from farmer to consumer. In short, it is not clear at all if supermarkets will be part of a solution to poverty or part of the problem.[4]

Until now, India, like South Asia itself, did not enter these discussions. Untouched by these global waves, India was an exception to the rule. Recent events, however, suggest that these waves have reached Indian shores. Rated in 2006 as the number one destination for global investment in the retail sector—for the second consecutive year[5]—India now finds itself conspicuous on the radar screens of investors. Quite independently of global retail trends, the agro-food sector has begun to attract domestic investments from Indian corporate

[1] There is no universally accepted definition of a supermarket, and definitions probably vary across countries. It is typically defined based on store space (300–4,000 square meters), number of checkout counters (more than three or four), and/or sales volume. In the United States, for instance, any full-line self-service grocery store generating a sales volume of US$2 million or more annually might be called a supermarket. For the purpose of this case study, supermarket refers to the entire class of large-format retailers and includes hypermarkets, discount stores, and supermarkets.

[2] The flying geese paradigm has been applied in several contexts. It has been used, for example, to explain the catching-up process of "latecomer" economies—in particular, of the sequential appearance and development of industries in a particular developing country. It is most famously associated with Akamatsu (1962).

[3] For factors that drive this transformation, see Reardon et al. (2003).

[4] Timmer (forthcoming) takes up this question in some detail.

[5] This rating comes from A. T. Kearney's *Global Retail Development Index* (A. T. Kearney 2006). This index is typically composed of 25–30 different variables capturing four aspects of retail development: market attractiveness, country risk, time pressure, and market saturation.

houses on a scale that suggests that this may well be a revolution in the making.

This case study takes a critical look at this change. While mapping the institutional and policy setting of the contemporary agro-food sector in India, this study attempts to go beyond the much-publicized advantages of this transformation related to efficiency gains along the supply chain and to train a lens on its less obvious and possibly more troubling implications. Its scope is seriously limited by the paucity of data and systematic research. The study is hence necessarily speculative, going only so far as to lay out the issues and drawing on studies elsewhere as illustrations. Indeed, this paper raises more questions than it answers. Yet this lack of research itself makes it important to examine this phenomenon.

The Retail Mosaic of India: The Story So Far

India has in the past earned the epithet of "lumbering elephant" for being slow in just about everything that advocates of globalization care about. This is true of the retail sector as well. For some years now, India has been conspicuous as an outlier.

India's retail sector today continues to be highly fragmented. It is a complex mosaic of diverse small-scale actors, including itinerant vendors, government outlets, cooperative markets, and small-scale corner stores, most of which are in the informal sector. As recently as 2002, only 2 percent of all retail (food and nonfood) trade in India was in the organized sector—the figure is put at 5 percent in the food sector. Compare this with India's Asian neighbors, and the nature of the Indian retail landscape becomes clear. The share of the organized sector in Malaysia, for instance, is put at 50 percent; in Thailand, 40 percent; and in the Philippines, 35 percent (Sasi 2004).

The Indian retail sector, food and nonfood together, employs an estimated 8 percent of the work force—the most people after agriculture. Estimates also suggest that India has not only the highest number of retail outlets in the world (at 12 million), but also the greatest density of retailers, at 11 per 1,000 people. In terms of size, only 4 percent of all retailers operate in spaces larger than 400 square feet. Consequently, in per capita terms, availability of retail space in India is among the lowest in the world, at 2 square feet per capita. This is in deep contrast with the 19 square feet per capita in the United States (KSA Technopak 2005).

These characteristics are mirrored in the food-retailing sector, which by all accounts is even more fragmented than the nonfood sector. The informal segment of the retail sector in India thus comprises a large number of small-scale, low-investment retailers, each serving a small catchment of consumers.

Despite this umbrella category, the informal retail sector is actually quite diverse, comprising a wide profile of actors. At one end are itinerant vendors and handcart vendors, especially for fresh fruits and vegetables. They form the last link in a long chain of intermediaries. Typically, they procure produce in wholesale markets and go door-to-door selling these goods. Their margins are often thin, and they operate with little capital. Often, these vendors have long-term relationships with buyers, in some cases even straddling generations.

Vendors also congregate in street vegetable markets (plaza markets) or by the roadside. Although reminiscent of the farmers' markets of the West, these vendors function as pure intermediaries. In both cases, the transaction between consumer and vendors is a social relationship rather than a purely economic one, something that characterizes most traditional modes of exchange. It is difficult to say how many such vendors there are in the country as a whole, given that there is no systematic enumeration.

Then there are the corner stores (called *kirana*) that sell groceries, dry goods, and a limited range of nonfood items. An estimated 5 million of them dot the retail landscape of India. The majority of food and food products are retailed through these neighborhood stores, which typically operate in an area of 200 square feet and sell 500 to 800 stock keeping units (SKUs).[6] Like the vendors, they usually have a loyal local clientele, many of whom buy on credit. Many of these stores offer home delivery services within a certain distance.

Alongside these neighborhood stores is a network of cooperative stores. Typically these stores are owned jointly by producers and state agencies and operated and managed by state agencies. Some are specifically for vegetables, like the Safal chain in

[6]SKUs are the smallest unit of any product for which accounts are kept and counted. In a typical supermarket the number of SKUs is on the order of 15,000.

Delhi or HOPCOMS in Bangalore.[7] Dairy products in particular have always been dominated by outlets of producer-cooperatives and operate under the aegis of the National Dairy Development Board of India. This board engineered a "White Revolution" in dairy production under Operation Flood. There are also more broad-based grocery and cooperative departmental stores (which sell groceries—only dry goods—and household and personal items) run by Civil Supplies Departments.[8] These entities were started with state patronage in the early 1960s at a time when shortages of basic goods were common. The objective of the Civil Supplies Corporations is expressly to provide "Common Man's Needs at Affordable Prices." Most are responsible for drawing on the state's stock of food staples and serve as channels for some government food schemes.

There have also been experiments with farmers' markets in some cities. The stated objective of these initiatives is to sidestep the exploitative terms of sale between farmers and traders by enabling farmers to sell directly to consumers. Several of these markets continue to function and have been regarded as successful on many counts. One example is the Rythu Bazaars in Andhra Pradesh, which were established in 1999.

Since the late 1990s a class of supermarket-style food stores has emerged, especially in cities in southern India. In contrast with traditional stores, these stores stock both dry and wet goods and often offer value-added or convenience products and ready-to-cook items, like pancake batter and cut vegetables. Most often, these supermarket-style stores are local businesses that have no or few branches and are typically owned by entrepreneurs who make medium-scale investments.

Because India is a vast and diverse country, there are significant regional and rural-urban differences in the particular mix of retail institutions. For instance, until recently, cities in the south have had more supermarket-style stores than have north Indian cities. Similarly, small towns and vast stretches of rural India are served predominantly by neighborhood stores and vendors.

Policy Issues

Why Has India Been Different?

Given this complex retail mosaic in India, why has change, specifically defragmentation, in the retail sector been so slow in its coming? Starting with broad-based economic reforms in 1991, perhaps even earlier, there was a pronounced increase in private participation in many sectors of the Indian economy—the striking examples being telecommunications and information technology. At the same time, socioeconomic parameters—such as diversifying diets and growing urban incomes—that provide the enabling conditions for such growth were likely already present in the 1990s. Why then did large-scale food retailing, barring a few cases, not emerge?

The answer to this paradox lies in a combination of factors. On the one hand are issues relating to the policy environment; on the other hand are demand-side issues.

One factor driving retail market development has been the flow of foreign direct investment into developing countries.[9] When retail markets in developed countries reach saturation, large-scale retailers in these countries begin to look at other markets to invest and operate in. In several developing countries, the opening up of economies to FDI spawned investment in food retailing. In Latin America, for instance, the food retail sector is increasingly and overwhelmingly operated by multinationals, and 70–80 percent of the top five chains are multinationals. In most cases, a handful of multinationals like Ahold, Carrefour, and Wal-Mart and smaller chains such as Casino and Metro Makro have dominated this transformation within countries (Reardon and Berdegue 2002). Regional multinationals such as Dairy Farm International (Hong Kong) and Shoprite (South Africa) have played this role too. Where FDI has not been

[7] HOPCOMS, for instance, has a total membership of 11,680 farmers who own 9 percent of the shares. A state agency owns 90 percent of the shares, and 1 percent is owned by cooperative banks and nongovernmental organizations (NGOs). HOPCOMS ran 231 stores in Bangalore as of 2005; and Safal, 279 in Delhi. Safal has made forays into processing and developing export markets.

[8] Civil Supplies Departments are designated wings within the government that oversee the functioning of the Civil Supplies Corporations.

[9] FDI refers to long-term investment in an enterprise by a firm in an economy other than the one in which it is based. It typically comprises a parent enterprise and the affiliate in the recipient country, with control resting with the former.

directly involved, it has nevertheless influenced the transformation through participation in joint ventures; in China, for instance, Lianhua (the Shanghai-based retailer) partnered with Carrefour. In the case of India, FDI has been disallowed in the retail sector and continues to be prohibited. The government has repeatedly staved off pressure from different quarters to change this policy.

India has allowed foreign participation only in wholesale cash and carry operations, single-brand retailing, franchising and joint ventures, and licensing arrangements. In 2006 the Indian government permitted only up to 51 percent foreign investment in single-brand retailing. Owing to this policy framework, multinationals could engage in only a limited way. Thus, FDI restrictions largely explain the absence of large foreign retailers in India.

Although FDI restrictions are a valid explanation, it has been argued that this cannot be an *adequate* explanation for the absence of large retailers per se, because India does not lack domestic capital. Yet throughout much of the 1990s, there were few large-scale investments in the retail sector. Some retailers grew steadily and successfully served a niche market in urban centers, such as Food World. One of the pioneers in supermarket-style food retailing in India, Food World was started in 1996 by the RPG Group, later collaborating with Dairy International of the Jardine Matheson Group. Food World was one of the first retail players in India to introduce "modern" inventory management systems and develop its own private label. Similar ventures were mostly confined to the southern states. For much of the 1990s, there were only a handful of such retailers. Until about 2000–2001, Chennai had five organized food and grocery retail chains, whereas other big cities such as Bangalore, Delhi, and Mumbai averaged only two to three such chains (Anand and Nambiar n.d.).

Several Indian corporate houses had been eyeing the food retail trade, but they perceived that the policy environment, among other things, was not entirely conducive.[10] For instance, industry sources often cited urban real estate laws as a constraint on operations; the Urban Land Ceiling Act limits the physical space available to businesses. Industries also claimed that the many taxes and octroi levied on organized retailing complicated operations.

The other aspect of policy that has confined large businesses is in the area of procurement and agroprocessing. Here, potential investors had to contend with several issues. Corporate involvement in agricultural production and trade has traditionally been severely curtailed in India. As in retailing, FDI was disallowed, except in tea plantations. The highly fragmented supply chain, coupled with the lack of high-quality infrastructure, meant that food retailing posed an extraordinary logistical challenge. Of those early entrants that took up food retailing in the 1990s, some exited soon after, ostensibly because of logistical problems (Nanz, for example, closed down in 1999).[11]

There was also a perception that demand was not large enough to support the scaling up of operations—something that is critical given thin margins on groceries. Although urban incomes, especially among the middle class, were rising and consumption patterns changing, the trend had only just begun and had yet to gather momentum. Furthermore, given strong and resilient regional preferences for consumption baskets, the consumers themselves were too heterogeneous to be served by large supermarkets. In fact, large-scale retailers that recently entered the market acknowledge this heterogeneity: "The product offering in two stores 12 kilometers away is totally different" (A. T. Kearney 2005, 4). For this reason many of the supermarket-style ventures have confined themselves to a particular region within India, even particular cities. For example, the RPG Group's Food World, Nilgiris, Margin Free, Giant, Varkey's, and Subhiksha all operate in southern cities; Sabka Bazaar operates in the capital region of Delhi; Haiko and Radhakrishna Foodland are Mumbai-centric; and Adani has been Ahmedabad-based (Anand and Nambiar n.d.).

The Beginnings of a Revolution

Despite the early languor of retail transformation, much of this has changed, especially since 2001. It seems that the Indian retail sector has taken flight.

[10] The following is typical of the sentiment among retail industry observers: "New retailing formats such as mass merchandising, hypermarkets, and warehouse clubs have not yet happened because of rules that prevent the development of organized retailing" (*Businessline* 2002).

[11] Nanz was promoted by the Delhi-based Escorts Group, the U.S.-based Marsh Supermarkets, and Nanz AG of Germany.

On the demand side, there is no denying that most of the socioeconomic parameters that drive the growth of organized retail food marketing are present in India today more than ever before. The average Indian household spends around half of total household income on food. Diets have diversified considerably in favor of new foods, including other cuisines. There is broad agreement that since liberalization and economic reforms in 1991, a marked shift has taken place in the mindset of the Indian consumer from need-based shopping to lifestyle shopping. Twenty-four percent of India's population falls in the 20- to 34-year-old age group (A. T. Kearney 2005) and seems to spend more freely than the previous generation did. High incomes fueled by tertiary sector growth have also created a new professional middle class that has begun to find intrinsic value in shopping experiences and consumer choice. This attitude permeates all areas, including food. This class has greater mobility and more contact with other countries and cultures, so that urban upper-class consumers look more like one another than before, blurring sociocultural boundaries. Urban lifestyles have changed perceptibly, and the growth in urban consumerism and a new "way of life" translates directly into huge potential demand for branded, packaged, and ready-to-eat foods. At the same time, there is rising concern about food safety among these classes, raising demand for foods and beverages that are hygienic, safe, and trustworthy. The growth of the bottled water industry in India, for instance, is testimony to this fact.

Mainly on account of these trends, the food retail sector in India today is worth about US$200 billion. Given that organized retail has been registering growth rates of approximately 40 percent a year over the past three years, it is expected to grow to US$460–470 billion by 2010 (CII and McKinsey and Company 1997).

Simultaneously, there has been a reorientation of government policy. This has its roots in the economy-wide reforms that began in 1991. Over the decade since, there has been a gradual change in policy in favor of greater private sector participation in different sectors. Recent policy changes for food processing have spawned the growth of that industry, both for export and for the domestic market. Policy changes have also provided some enabling conditions for retailers in terms of logistics and supply chain management (see Box 1 for examples).

Box 1: Recent Policy Initiatives in the Food-Processing Industry

- Most processed food items were exempted from licensing under the Industries (Development and Regulation) Act, 1951, except items reserved for the small-scale sector and alcoholic beverages.
- Food-processing industries were included in the list of priority sectors for bank lending in 1999.
- Automatic approval for foreign equity up to 100 percent is available for most processed food items except alcohol, beer, and those reserved for the small-scale sector, subject to certain conditions.
- The excise duty on processed fruits and vegetables was lowered from 16 percent to 0 percent in the 2001–2002 budget.
- Licensing powers were delegated to regional offices under the Fruit Products Order, 1955.

Budget of 2004–2005

- Under the Income Tax Act, the government allowed a deduction of 100 percent of profits for five years and 25 percent of profits for the next five years for new agroprocessing industries set up to process, preserve, and package fruits and vegetables.
- The excise duty of 16 percent on dairy machinery was reduced to zero to help promote the dairy-processing industry. The excise duty on meat, poultry, and fish was reduced from 16 percent to 8 percent.

Budget of 2005–2006

- The customs duty on refrigerated vans was reduced from 20 percent to 10 percent.

Source: Ministry of Food Processing Industries 2006.

Domestic firms have started responding strongly to this latent demand, helped along by a more conducive policy environment. The star entrant has been Reliance, a leading Indian conglomerate with no prior agribusiness experience, which announced that it would invest US$3.4 billion to become the country's largest modern retailer by establishing a chain of 1,575 stores by March 2007. Hypercity Retail, a subsidiary of K Raheja Corp Group, plans to open 55 hypermarkets by 2015, and Bharati is set to follow with similar plans. Besides these

examples of recent ventures and corporate expansion plans, several other enterprises have expressed similar ambitions, pointing to the immensity of the transformation currently underway.

Meanwhile, foreign investors are exploring ways to overcome policy obstacles to operating in India. Wal-Mart is considering opening a Sam's Club wholesale business through a joint venture and selling strictly to other retailers. This strategy skirts the issue of not being able to sell directly to consumers and establishes a presence in the local market. Tesco is planning to enter the market through a partnership with Home Care Retail Mart Pvt. Ltd. and expects to open 50 stores by 2010.

Organized food retailing is still in its infancy.[12] For instance, food retailers in India today are quite different from their counterparts in the developed world. Indian retailers have extremely high average SKUs for fruits and vegetables relative to their western counterparts, mainly on account of their heterogeneous clientele with particular cultural and regional preferences. Store areas are not particularly large—anywhere between 2,000 and 10,000 square feet. Arrangements for sourcing vary across actors. Some retailers choose to buy from the wholesale market, whereas others have dedicated suppliers, small and large. Investments at the front end and in consumer interface, observers concur, have been tremendous. The extent of investment in the back end, in terms of on-farm handling, storage, and transport, has been lower. One exception is Metro, which made deep investments in building a high-quality supply chain to support its operations. Observers suggest that whereas some retailers have adopted a "big bang" approach and sought to maximize the number of new outlets and spatial reach, others have adopted a measured approach and focused on putting reliable supply chains in place. Metro, with only two stores in operation in over five years, is often cited as an example of the latter approach.

With the fledgling transformation in flux, a shakeup is inevitable and impending. How it unfolds is a matter of current interest. For instance, in some urban neighborhoods, where there was just 1 food retailer five years ago, now there are 10. In some of these outlets, turnover of merchandise has fallen by half in the face of competition; others are even losing money. Observers predict that in the near future, retailers will end up carving out niches for themselves within the food retail sector or will reposition themselves and consolidate. Only time will tell.

Stakeholders

So far, the discussion of the retail transformation in India's agro-food sector has been largely celebratory, at least in the popular media. Yet this complex transformation is bound to have both winners and losers. Clearly, two issues merit careful scrutiny. First, how will the efficiency gains from this transformation be distributed among actors? Will it be equitable, or will the rents be cornered by those with greater economic power? Second, what kinds of costs will be associated with the displacement of livelihoods that such a transformation will entail?

Policy makers clearly recognize the importance of these issues. In a speech in early 2005, Union Minister of Commerce and Industry Kamal Nath told a gathering of business leaders, "If any of you have come here to hear from me whether or not the Government is about to announce FDI in the retail sector, you are going to be disappointed.... The nature of the retail sector in India is too complex for a hasty decision to be taken in this regard" (Nath 2005). It is therefore imperative to examine the exact nature of potential gains and losses to the different stakeholders.

Indian corporate houses would stand to gain the most, especially given current FDI regulations. Recent years have seen a concerted effort by industry groups such as Federation of Indian Chamber of Commerce and Industry (FICCI) and the Confederation of Indian Industry (CII) to secure important changes in retailing policy. Their pitch to the government centers largely on efficiency gains from the technological changes brought about by large-scale retailers.

This approach could be a way to address the huge waste in Indian agriculture. Figures suggest that as much as 30 percent of produce is wasted annually, and only a fraction of agricultural produce is processed—as low as 2 percent for horticultural crops (Ministry of Food Processing Industries 2006).[13] Investment in cold storage and processing

[12] This entire section is based on information gathered from conversations with industry observers in Bangalore, Chennai, and Hyderabad during March–April 2007.

[13] The figure is higher for livestock produce.

by large-scale retailers would redress this situation and lead to huge efficiency gains. Industry groups also argue that retailing is a highly labor-intensive sector and would generate employment. Some also claim that larger retailers would bring in more tax revenue and conform to labor laws, because it is much easier to monitor and enforce these regulations for large retailers than it is for the informal retail sector, which is diffuse and small in scale.

The supporting and ancillary sectors, such as processing, cold storage, and transport, constitute the other group of stakeholders. Large investments in these facilities, especially in the rural areas, would be welcome in the context of a weak rural industrial base if they generate employment.

As far as FDI policy goes, domestic industrial groups have been somewhat more divided. Some lobbying groups recognize that Indian industry would likely benefit from joint ventures with foreign counterparts, which would bring in new, state-of-the-art technology and larger investments. Industry observers suggest that Indian retailers have an advantage over foreign retailers because success in the retail trade in India has a significant component relating to home-ground advantage—that is, understanding the heterogeneity and particular characteristics of the Indian consumer—not to mention that Indian retailers have a head start. In fact, the swiftness with which Indian businesses are entering the retail sector suggests they recognize this! On the other hand, some fear that domestic firms might lose out to larger foreign retailers.[14]

This concern is universally true for another stakeholder group—small traders, who form a large constituency.[15] As expected, they have been at the forefront of protests against large retailers with deep pockets. When Metro, the German cash-and-carry wholesaler, opened an outlet in Bangalore, the "Silicon Valley" of India, the joke went that it probably saw more protesters than customers. Whereas retail traders often have professional associations that enable some sort of collective action, itinerant vendors have little power or voice, let alone say, in matters of policy. They are diffuse and operate at a small level, and although they network with one another, they rarely have collective lobbying power.[16]

The nature of actors in the informal retail sector in India merits attention. It is often mentioned that the retail sector serves as a receptacle for the self-employed. A large section of this group has few employable skills and turns to retailing produce or groceries for lack of better opportunities. Although not true across the board, this is certainly true of itinerant vendors and street vendors. From this perspective, a supermarket that captures their clientele could simply dismantle their livelihoods. As it is, this group has in the past suffered the consequences of city-level actions, such as forced evacuations.[17] It is also difficult to imagine that they will be absorbed into the formal retail sector in any way, given their lack of marketable skills. There are supermarkets, however, that incorporate vendors. A retail format called store-within-store (adopted by Fabmall, for instance) accommodates existing vendors within the supermarket, providing them with not only store space, but also equipment like refrigerators. Similarly, Safal's chain of fruit and vegetable outlets in Bangalore serves as a supplier to vendors in the morning and an open shop to individual buyers during the day. These formats may aid rather than displace local vendors.

Consumers, another stakeholder group, are of course central to the discussion on retailing. They are often used prominently as mascots for the retail industry to tout consumer benefits such as greater choice, higher quality, and improved shopping experiences. Moreover, the emergence of supermarkets, with their sophisticated supply chains, ensures safe products that conform, typically, to recognized grades and quality standards. This conformity is perhaps the hallmark of supermarket-style food retailing and is particularly important in India, where food-borne diseases and rampant adulteration by unscrupulous dealers are prevalent.

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[14] For instance, Indian retail groups, such as the RPG Group and the Pantaloon Group, have expressed their strong opposition to allowing more FDI into Indian retailing, especially majority foreign ownership. They argue that the sector is still at an early stage of development and multinationals such as Wal-Mart would swamp local players, especially the *kirana* owners (*Business Standard* 2005).

[15] For an interesting discussion on the effect on existing retailers, see Reardon and Hopkins (2006).

[16] India does have a National Association of Street Vendors of India (NASVI) that has been active in this area.

[17] A National Policy of Urban Street Vendors was adopted in January 2004 to address these issues.

On the question of price, however, the benefits may not be as widespread. Consumers straddle the entire spectrum of socioeconomic classes in India and are therefore highly heterogeneous. It may well be that the ones who are most likely to benefit from supermarkets are the urban middle and upper-middle classes. This group has emerged from the post-liberalized India with the greatest spending power. The less visible, but certainly much larger, class of consumers consists of the poorer segment of the population. It is difficult to say how supermarkets will change things for them.

Only a few supermarkets in India have made claims of cheaper food. Specialized discount chains like Subhiksha, which focus on own-brand retailing of grains and pulses, are indeed much cheaper. Food World claims that its produce is 15 percent cheaper than alternative sources. Most other retailers, however, have focused on exploiting consumers' willingness to pay for convenience, choice, or a high-quality shopping experience.[18] It is difficult to imagine these supermarkets catering to low-income groups. Over time, however, given the high contestability of retail markets, it is conceivable that supermarkets will indeed offer lower prices across the board.

In a country like India, this situation still leaves the issue of social access. Will supermarkets coexist with traditional food retail markets that will continue to serve the excluded segment? It is difficult to say. If, for instance, consumers patronizing the informal retailers are wooed into supermarkets, it would jeopardize the survival of the former. In that case, poorer consumers may be hurt by the coming of supermarkets.

Retail power also raises important questions about the relative position of farmers, and "manufacturers" more generally, in the agro-food supply chain. Questions about the supply chain are especially relevant in the context of India, where the industrialization of agriculture is happening in tandem with the retail transformation, and these questions have attracted the most attention from researchers. Studies of the Indian case, however, are relatively scarce at present. Vertical linkages are sometimes beneficial to small, poor farmers, and at other times they are not. The effects of vertical linkages for small farmers seem to vary across crops and regions and with the exact nature of arrangements.

In India, procurement strategies cover the entire spectrum. At one end, for instance, is Bharti's Field Fresh, which contracts only with large farmers cultivating a minimum of 1,000 acres. Its executive explained, "I can manage ten or twenty farmers, but not thousands" (Witsoe 2006, 18). On the other hand, Choupal Fresh plans to source from small farmers with as little as one acre under cultivation. Others procure from wholesale markets as well as farmers. Systematic research would yield a clearer picture of this aspect of the agro-food industry.

Irrespective of whom retailers purchase from, these sources face one common problem: Strategic decisions at the retail end can have sudden and costly impacts on producers up the commodity chain. For instance, given that retail markets can be highly contested, retailers face pressure to keep procurement costs low.[19] If the retailers are monopsonists at the farmer's end, they achieve this by driving down the price paid to the farmer. This issue is of course an empirical one, valid in some instances and not in others. In a country like India, however, with a huge population of small farmers, this risk to farmers must be an important consideration.

Although the coming of supermarkets clearly has both positive and negative ramifications, the issue is complicated by a woeful lack of data and research. In India, more than elsewhere, there is not much clarity on how these developments will affect the different stakeholders, partly because the phenomenon is so recent.

Policy Options

For the government, this retail transformation presents a confounding problem. As control over the agro-food chain devolves to large-scale private

[18]Apna Bazar, which started with a middle-class iamge, recently repositioned itself as an upper-middle-class shopping venue, suggesting a shift to serving the upper end of the consumer spectrum. Even Subhiksha aims to be the principal store of purchase for at least 40 percent of all consumers living within 500–750 meters of the store. This suggests a strategy that is targeting a subsection of the population and not all.

[19]Timmer (forthcoming) addresses the issue of contestability, pointing out that it is a key aspect. By extension, it is important to have contestability not only at the consumer end, but also at the procurement end.

sector players with deep pockets, several critical questions emerge at various levels.

On the one hand, the ongoing agrarian crisis and the erosion of rural livelihoods are pressing concerns. In that context, and given the enormous postharvest wastage, the emerging food retail scenario could solve some problems—it could ensure postharvest efficiency in supply chain management and stable markets for farmers. It can also be an instrument for bringing about changes in cropping patterns, agronomic practices, pesticide use, and harvesting techniques, with important implications for farm incomes. Modern supply chains would also ensure traceability, and with monitoring, contribute to safe food that measures up to recognized quality standards. The retail sector would generate employment along the entire supply chain, including in intermediate sectors such as cold storage and transport. Needless to say, consumers would presumably benefit not only from having greater selection of produce and shopping experiences, but also from having access to high-quality produce.

At the same time, there are those who would almost surely be hurt—wholesale traders, retailers, itinerant vendors, and even poor consumers. As for farmers, it is not clear how much of the efficiency gains would in fact accrue to them. How can the government negotiate this?

At one level, the issue is to what degree the government should *enable* such a transformation. This issue relates to two sets of policies. First, should it press on and ultimately open up retailing to foreign investment? Second, disregarding FDI, should it reconfigure domestic policies, including those related to urban real estate and agricultural marketing, to allow businesses to link up and scale up operations?

At another level, how should the government address the livelihood issues of those who might be swept away by these changes? Should its policy be compensatory so that it helps them cope, or should it enable players in the informal retail sector or farmers to be part of this change?

A third critical question pertains to institutional diversity. Regardless of how inclusive this retail transformation may be, is the preservation of institutional diversity in agro-food marketing channels desirable for its own sake, as an end in itself? If so, what kinds of policy instruments can ensure that diversity is preserved?

Opening up FDI in retailing, many fear, is the thin end of the wedge. With it will come, inevitably, the tendency toward concentration. Historically, a period of mushrooming supermarket ventures first generates a highly contested market; in the second phase, there is a shake-up that promotes a trend toward consolidation in the sector. In Latin America the top five chains in each country control 65 percent of the supermarket sector, compared with 40 percent in the United States and 72 percent in France (Reardon and Berdegue 2002). This consolidation can happen in two ways: Foreign chains can acquire local chains, or larger domestic chains can acquire smaller chains and independents. Alternatively, consolidation can occur through development of new outlets. Both processes have happened in Latin America. FDI is thus bound to amplify and hasten the process of consolidation, owing to the sheer amount of capital available to large multinationals. In the first eight months of 2002, for example, five top global retailers spent US$120 million to build new stores in Thailand. During 2002 Wal-Mart spent US$660 million in Mexico (Reardon 2006). Multinationals have already begun acquiring Indian firms in the food-processing industry,[20] and this process could occur in food retailing as well, as a prelude to consolidation. On the other hand, it is clear that even in the absence of FDI, the retail revolution has well and truly begun and India's domestic firms are not particularly capital constrained. Opening up retailing to FDI would only accentuate the trend and not alter it in any significant way.

The next question pertains to the policy environment for domestic industry. Can the government incorporate this retail transformation, driven by the private sector, into its broader agenda of poverty alleviation and food security? If so, how?

The arguments straddle both positive and negative responses to this question. If supermarkets are to

[20] MTR, a family-owned concern, was bought out in 2006 by Norways Orkla for US$100 million, Nilgiris in Bangalore sold a majority stake to Actis for US$65 million, and Barista was acquired by Lavazza of Italy for US$125 million. At the same time, Indian enterprises were acquiring foreign brands: for example, Tata acquired Tetley for US$430 million in 2000, Eight O'Clock coffee for US$220 million in 2006, and Energy Brands, Inc., for US$677 million in 2006.

aid poverty alleviation rather than obstruct it, then they need to be inclusive of the poor—not only the poor farmer, but also the poor consumer and poor trader.

Few would disagree that many informal sector food retailers need better livelihoods and that it is desirable to enable them to achieve this goal, if necessary by helping them exit this sector. Whether supermarkets can do this in a positive way, however, is the critical question. If supermarkets do in fact crowd out the vendors, these people are unlikely to be absorbed into the sector as employees. A recent entrant to food retailing, Reliance, announced that its strategy is to employ students and housewives in addition to hiring employees from other retailers. On the other hand, firms such as Food World have specifically trained youth from economically weaker segments of the population as staff. In terms of aggregate employment effects, studies suggest that the traditional retail channels are far more labor intensive than the formal retail sector. A study of retail food channels in Vietnam found that every metric ton of vegetables sold accounted for three times as much employment for street vendors as for supermarket staff (Asian Development Bank 2004). If this is true in India, it makes a strong case for supporting the informal retail sector, improving the condition of informal actors, and indeed maintaining the institutional diversity of the food retailing sector.

Experience in Latin America suggests that small traditional stores and plaza markets have been losers. In the six largest countries of South America, there was a marked shrinkage in plaza markets in the 1990s: 64,198 small shops went out of business in Argentina between 1984 and 1993, and 5,420 in Chile between 1991 and 1995. The exceptions were fruit and vegetable specialty shops (Reardon and Berdegue 2002). One cannot assume that smaller traders will be able to make the necessary investments to be able to compete with large-scale retailers. On the other hand, they do not always fail. Farina et al. (2004), for instance, document that in Brazil the number of traditional retailers and independent supermarkets increased by 33 percent and 7 percent, respectively, between 1994 and 2002, whereas the number of chain retail stores declined by 21 percent. In India, industry observers point out that informal food retailers are very resilient and may have risen to the challenge. Some informal retailers have upgraded their storefronts, improved in-store displays and customer service, and adopted more sophisticated stock management and billing procedures. These changes show that traditional retailers can adapt, and even thrive, against the odds.

As for consumers, supermarkets in India have focused exclusively on niche markets in urban areas catering to the upper middle class. There is some evidence that poor consumers in developing countries, including Vietnam, rarely have access to supermarkets owing to distance as well as higher prices. In other countries, however, supermarkets tend over time to cater to poorer sections and serve non-urban centers, often by developing satellite chains with different formats (such as Shoprite in Zambia). About 40 percent of Chile's smaller towns now have supermarkets, as do many small to medium-sized towns even in low-income countries such as Kenya. In China, supermarkets are now spreading beyond the top 60 cities. The fact remains, however, that as long as there is a large segment of extremely poor people, supermarkets will find it a challenge to reach out to them. In this context, will the retail channels, public and private, that already serve them survive and continue to do so?

Finally, what about small farmers? To what extent do supermarkets procure from local producers as opposed to importing from other countries? Also, to what extent are small and marginal farmers included in the supply chains of the retail food sector?

The evidence on domestic and small farmer participation in the supermarket-driven food chains is mixed. Reardon and Berdegue (2002) estimated that supermarkets in Latin America buy 2.5 times more fruits and vegetables from local producers than all the exports of produce from Latin America to the rest of the world. On the other hand, Shoprite Checkers in Zambia has been criticized for sourcing supplies through its parent company in South Africa rather than from Zambian producers (Mpundu 2005). In general, evidence suggests a range of procurement systems, from total reliance on traditional wholesalers delivering to individual stores (for small chains), to outsourced, decentralized procurement systems (for small to medium-sized chains), to procurement from large-scale, specialized wholesalers or processors (Berdegue et al. 2005). Some studies find that supermarkets tend to source from large-scale processors in order to reduce transaction costs, because those processors possess adequate logistics and transportation capacity and are able to meet

the private standards of the retailer. For example, the Xiaobaiyang chain in Beijing is known to have shifted from 1,000 to 300 processed food suppliers in two years as it centralized its procurement system (Hu et al. 2004). Similarly, leading Russian chains focus only on a handful of foreign and domestic suppliers for dairy products (Dries and Reardon 2005). Some other studies show substantial involvement of small growers (such as for tomatoes in Nicaragua and Guatemala and lettuce in Guatemala). Nonetheless, small farmers who do not have the capital to meet the requirements of supermarkets tend to be excluded, as illustrated in studies of potatoes in Ecuador (Zamora 2004) and vegetable producers in Thailand (Boselie 2002).

Also, the net benefit to the farmer of selling to supermarkets rather than to traditional markets is not always higher. For Guatemalan tomato farmers, Hernandez et al. (2004) show that there is not much difference in net return between selling to wholesalers that sell to supermarkets and selling to wholesalers that sell to traditional retailers. There is a perception, however, that the market risk is lower when a farmer enters a relationship with a wholesaler dedicated to the upper-tier market, such as supermarkets. For growers to enter these markets, it appears that farmers' associations or cooperatives tend to be necessary to reduce transaction costs, but these do not guarantee market access.

Conversations with farmers in southern India suggest diverse outcomes. In some areas farmers are immensely pleased with the advent of retail food buyers, who pay them competitive prices and have had a disciplining effect on the commission agents and wholesalers. In other places farmers are disenchanted with these buyers for reneging on oral commitments to buy and forcing prices down. What is certain, however, is that supply chain issues are critical in a country where smallholders predominate. Given this mixed evidence, it is difficult to draw up a prognosis for the small farmer in India.

Although the empirical evidence clearly offers several lessons and insights, the government walks a tightrope and must weigh the potential benefits of such transformation against its possible negative consequences—and find a way to make supermarkets a part of the change it seeks to bring. As more research on these various aspects of agrofood retailing filter in, the situation should become clearer. No wonder then that the minister in his 2005 speech to business groups appealed for caution in policy making, and against haste.

Assignment

Your assignment is to recommend to the Government of India a set of policies to be pursued to guide future developments in the food retail sector, taking into account the interests of the different stakeholder groups.

Additional Readings

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Chapter Three
Contract Farming in Developing Countries: Patterns, Impact, and Policy Implications (6-3)
by Nicholas Minot

Executive Summary

Contract farming may be defined as agricultural production carried out according to a prior agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. Often, the buyer provides the farmer with technical assistance, seeds, fertilizer, and other inputs on credit and offers a guaranteed price for the output. Proponents of contract farming argue that it links small-scale farmers to lucrative markets and solves a number of problems small-scale farmers face in diversifying into high-value commodities. Opponents argue that the imbalance in power between the buyer (often a large agribusiness company) and the farmer leads to an agreement unfavorable to the farmer. Also, they argue that small farmers are often excluded from contract farming schemes, resulting in greater income inequality and social tensions in rural areas.

To understand the rationale for contract farming, it is useful to view it as one form of vertical coordination, in between spot markets (in which supply and demand are coordinated through prices alone) and vertical integration (in which supply and demand are coordinated by having one firm carry out multiple stages in the market channel). Transaction cost economics, a branch of new institutional economics, suggests that, because contracting involves costs, it is economically justifiable only (1) when the buyer is a large firm (a processor, exporter, or supermarket chain); (2) when the product is characterized by large quality variations, perishability, technically difficult production, and/or a high value-bulk ratio; (3) when the destination market is willing to pay a premium for certain product or production attributes that can be ensured only by close coordination between farmers and buyers; and (4) when the policy environment is conducive.

The vast majority of empirical studies suggest that contract farming schemes generally raise the income of farmers participating in the schemes. The evidence is less clear on the degree to which buyers are willing to contract with small-scale farmers—the answer depends on the commodity, the market, and the policy environment.

Contract farming can be promoted with a favorable investment climate, deregulation of direct transactions between companies and farms, the development of grades and standards, facilitation of farmer organizations to link farmers and firms, cooperation with private firms on provision of extension services, provision of mediation services, and exploration of innovative ways to enforce contracts.

Contract farming cannot serve as a broad-based strategy for rural development because it only makes economic sense for certain commodities in certain markets. On the other hand, in those circumstances, it can be an effective institution for helping small farmers raise their productivity and orient their production toward more remunerative commodities and markets.

Your assignment is to recommend a set of policies to be considered by a developing-country government to facilitate contract farming for fruits and vegetables that will benefit low-income farmers, taking into account stakeholders' interests.

Background

Small farmers in developing countries face a number of constraints that limit their productivity.[1] First, they lack information about production methods and market opportunities, particularly for new crops and varieties. Second, even with sufficient information about profitable investments,

[1] A "small farmer" is defined as one who relies primarily on family labor with modest or only occasional use of hired labor. In many developing countries, this definition would correspond to farms of less than three to five hectares.

small farmers often lack the necessary financial reserves, and access to credit is limited by the lack of collateral. Third, small farmers operating near subsistence are understandably more risk averse than larger farmers. They generally prefer to assure themselves a minimum supply of food before expanding commercial production for an uncertain market.

Contract farming has attracted the interest of researchers and policymakers because it has the potential to solve several of these constraints simultaneously. Contract farming may be defined as agricultural production carried out according to a prior agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. Often, the buyer provides the farmer with technical assistance, seeds, fertilizer, and other inputs on credit and offers a guaranteed price for the output (Eaton and Shepherd 2001).

Although reliable estimates are not available, international trends in agriculture suggest that the prevalence of contract farming may well be increasing in developing countries. The growth of high-value agriculture, the expansion of agricultural processing in developing countries, the consolidation in the retail food sector, and the increased demand for quality and food safety are all driving the need for vertical coordination in agricultural supply chains (Gulati et al. 2006).

Contract farming is the subject of some controversy, however. Among proponents, contract farming is seen as a solution to the problems of information, credit, and market risk that small farmers face in commercial production. They see contract farming as facilitating the integration of small farmers into commercial agriculture, leading to income growth and poverty reduction. Critics, on the other hand, see contract farming as a way for large firms to take advantage of the land and poverty of small farmers, effectively paying them less than the minimum wage and "taking control" of their farms. The integration of small farmers into commercial agriculture is seen as a negative trend, leading to higher risk, indebtedness, and income inequality (Little and Watts 1994; Singh 2002).

This case describes the role of contract farming in agricultural development, focusing on its impact on small farmers in developing countries. In particular, the paper has three objectives:

- to describe the economic rationale for contract farming as a way to organize agricultural production,
- to review previous research on the impact of contract farming on small farmers, and
- to identify key stakeholders and derive some implications for development policy.

Contract Farming as a Form of Vertical Coordination

All markets require some form of vertical coordination—that is, coordination of supply and demand between different participants in the marketing channel, such as farmers, processors, wholesalers, and retailers. Consider the example of a maize farmer in the western highlands of Kenya. If the farmer intends to sell some of the maize harvest, he or she needs to know what kind of maize is in demand, where and when to sell it, and what price it is likely to sell for. Similarly, a maize-milling company in Nairobi needs to know what kind of maize will be available for purchase, where to buy it, when it will be harvested, and how much it will cost. This type of vertical coordination problem exists throughout the marketing channel—for example, between processors and wholesalers and between wholesalers and retailers—but the focus here is on the relationship between farmers and the buyer of the agricultural output.

Often farmers sell in spot markets, involving transactions between buyers and sellers that involve no commitments outside the transaction itself. In this case, coordination of supply and demand with respect to quantity, quality, and timing occurs only through the price. Farmers learn that prices are higher in Nairobi than in the local district market, higher in the off-season than during the harvest, and so on, and they respond to this information. Similarly, buyers learn how prices vary over the seasons and throughout the country, and they adjust their procurement strategy accordingly.

Sometimes, vertical coordination between buyers and sellers is accomplished with informal or formal agreements with regard to price, quantity, timing, and product attributes. For example, the maize processor may approach the farmer before planting season and agree to buy one ton of maize at harvest time for a fixed price, assuming the maize meets a certain quality standard. The marketing contract works when both the farmer and the buyer gain from having the terms of sale arranged

in advance. In some cases, this level of coordination is not enough, and the processor also provides agricultural inputs and technical assistance on credit. This resource-providing contract makes sense when the buyer has more information about production methods or wants to ensure a level of quality or food safety. For example, the buyer may specify the types of pesticides that can be used and the timing of their application to be certain that pesticide residue standards are met. Finally, some production management contracts specify the manner in which the commodity is to be grown, such as the planting density, use of pesticides, and timing of harvest (Martinez 2002).

Of course, contracts involve costs for both farmers and buyers. The buyer must draft a contract, educate potential farmers about the terms of the contract, sign up participants, monitor compliance with the contract, and develop a strategy for enforcing the contract. The farmer makes a commitment to sell to a buyer at a given price and gives up some autonomy in production decisions. In order for contract farming to be worthwhile to both parties, the gains from reducing transaction costs must exceed the costs of establishing the contract.

The tightest form of vertical coordination is vertical integration, in which agricultural production and processing are carried out within the same company. Instead of dealing with contract farmers who are farming their own land, the company purchases (or leases) farmland and hires farm workers. Clearly, the company has more control over how the product is grown and harvested when it owns the land and hires the labor, but there are disadvantages as well. For example, farm workers are paid by the day, so they are less motivated than independent farmers and require closer supervision. In addition, it is more difficult and costly to adjust output when the firm produces on its own land.

What determines whether a given supply channel uses spot markets, contracts, or vertical integration? The most useful way to analyze vertical coordination is with the new institutional economics (NIE). Traditional neoclassical economics tends to assume that the institutions (defined here as the laws, codes, and social norms that define acceptable behavior) are given, whereas NIE looks specifically at the factors that shape the design of economic institutions (Grosh 1994). One branch of NIE, called transaction cost economics (TCE), explains relations between buyers and sellers in terms of the costs of carrying out transactions, including finding a buyer, negotiating a price, delivering the commodity, and obtaining payment, as well as the risks associated with the transaction, including the risk of being cheated (Williamson 2000). The costs of carrying out a transaction can be considerable and can be exacerbated by three problems:

- Imperfect information—The buyer and seller never have all the relevant information they need to negotiate the terms of the transaction. Often the seller has more information about the quality of the product, but the buyer has better information about the market. This information asymmetry prevents markets from operating efficiently.
- Limited ability to process information—Even if the buyer and seller had all the relevant information, they would not have the time or capacity to analyze it thoroughly, a problem sometimes called bounded rationality.
- Dishonesty—The buyer and seller can never fully trust each other, since each has some short-run incentive to misrepresent the truth and violate the terms of their agreement. This is called opportunistic behavior.

Because of imperfect information, sellers must spend time finding potential buyers and negotiating over the price. Buyers have imperfect information about the product they are purchasing, which sometimes means they must inspect it before purchase. The possibility of dishonest behavior means that buyers and sellers cannot simply rely on the claims of potential trading partners; they must take into account the possibility of being cheated. And limited ability to process information means that there is little incentive to exhaustively research all their options. Even after gathering information, they still must decide on the basis of incomplete information.

Formal and informal economic institutions are designed to address these problems by facilitating communications, disseminating information, and punishing dishonest behavior. For example:

- the legal system helps to enforce contracts and limit opportunistic behavior;
- trade associations and better business bureaus help to discourage dishonesty by

establishing codes of conduct and by identifying and exposing firms that use unscrupulous practices;

- grades and standards are used to define quality and facilitate negotiations;
- credit bureaus reduce the risk faced by lenders and discourage discretionary default; and
- informal codes of conduct serve to outline acceptable behavior in transactions.

These institutions, however, cannot eliminate all costs and risks associated with carrying out a transaction, particularly in developing countries where the legal system and other institutions are less well developed. And within developing countries, the issues of transaction costs are particularly relevant in the agricultural sector because of the perishability of the product, the geographic dispersion of agricultural production, and farmers' limited resources and access to information.

The risks of opportunistic behavior are even greater when the buyer or seller must make certain investments that are only useful for carrying out a transaction with the other party. For example, to grow coffee, farmers must invest in planting coffee trees, which take four to five years to begin producing. After farmers make the investment, their negotiating position is seriously weakened and the buyer may be tempted to lower the price, particularly if there are no other processors in the area. Realizing this, farmers are understandably reluctant to make the investment in the first place. Because of this problem of asset specificity, farmers may not be willing to invest in producing a commodity, even if there is a price at which both farmers and processors earn profits.

Asset specificity may be an issue for the buyer as well. If a processing plant is designed to handle just one commodity, the processor is "locked" into that sector and depends on a steady supply of the raw material. If there are only a few suppliers and the buyer is concerned about collusion among them, the incentive to invest in the processing plant will be reduced. This problem is probably less severe for buyers than for farmers, however, because there are often many suppliers, making collusion difficult. As discussed later, this may be an important incentive for processors to work with a large number of smaller farmers rather than a small number of large farmers.

Conditions under Which Contract Farming Makes Sense

Under what conditions will contract farming be profitable for both growers and buyers? This brief discusses the role of three factors: (1) the type of buyer, (2) the type of commodity, and (3) the type of destination market.

Type of buyer. What types of buyers are more likely to organize a contract farming scheme? Setting up a contract farming scheme involves large fixed costs[2]: the buyer needs a team of field agents who negotiate terms with farmers, distribute inputs, provide technical assistance, and collect the product. As a result, contracting is generally not worthwhile for traditional wholesalers or other small- and medium-scale buyers. Rather, the buyers in a contract farming scheme are more likely to be large-scale processors, exporters, or supermarket chains. In addition, buyers with large capital-intensive processing plants have more incentive to contract with farmers because they need a steady and reliable flow of raw materials to maintain a high capacity-utilization rate. This is particularly true if the plant purchases a large share of the locally available product, since there is more risk of supply shortfalls owing to weather or changes in the market. For example, the profitability of a sugar mill is dependent on having a steady flow of sugarcane over the year, including supplies before and after the peak harvest season. Sugar mills often use contract farming to stagger production over the season and increase capacity. In addition, because sugarcane is bulky and perishable, it cannot be transported far, and sugar mills often purchase a large share of the cane available in a given area (Sartorius et al. 2004).

Type of agricultural commodity. What types of agricultural commodities are more likely to be produced using contract farming? If a product is homogeneous and nonperishable, if quality is easily observed, and if farmers are familiar with the production methods and market requirements, then transaction costs are low. In this case, there is no need to incur the costs associated with contracts, so spot markets will be more efficient. These factors explain why spot markets are the standard form of vertical coordination between farmer and buyers in the markets for staple grains, starchy

[2] Fixed costs refer to costs that do not vary with the scale of production. In contrast, variable costs are those that increase with the volume of production.

root crops such as cassava, and pulses. Even perishable fruits and vegetables, when widely grown and intended for rural consumption, are usually sold on the spot market, although there are often informal relationships between farmers and buyers which may serve some of the functions of formal contracts.

More vertical coordination is required, however, for commodities with the following characteristics:

- Economically important quality variation—Vertical coordination is more likely if consumers are willing to pay a premium for a variety or attribute that will cover the additional cost of producing it and the cost of vertical coordination. Farm-level investments in human capital (skills), physical capital (assets), or specialized inputs are required to raise quality. In this case, vertical coordination is needed to provide producers with the incentives and the means to make those investments.
- High value-bulk ratio—A given percentage premium for higher quality is more likely to cover the incremental cost of contracting if it is a high-value commodity.
- High perishability—Not all perishable goods are produced under contract, but the need for some form of vertical coordination increases when the commodity is highly perishable. Perishability increases the need for farmers and buyers to coordinate the timing of harvest and delivery. In addition, a farmer's bargaining power is seriously weakened once the product is harvested unless there is a contract relationship that ensures a fixed price or at least a personal relationship that ensures a "fair" price.
- Technically difficult production—If buyers can reduce the cost of production with technical expertise, specialized inputs, or credit, then vertical coordination is useful in transferring these resources to farmers. Farmers in developing countries may not have the available cash to purchase inputs at planting time, so the contract allows the buyer to provide them on credit and to recover the cost of the inputs by deducting it from the payment to farmers at harvest.

These factors imply that vertical coordination is needed for high-quality fruits and vegetables, organic products, spices, flowers, tea, tobacco, seed crops, and other quality-sensitive and perishable commodities. In dairy production, the high degree of perishability and the importance of quality encourage vertical coordination, including contract production and dairy cooperatives. Dairy cooperatives can be considered a form of vertical integration in that farmers jointly purchase and manage processing facilities. Medium- and large-scale poultry production is often organized in a contract farming arrangement, in which the processor provides chicks, feed, and medicine to contract farmers and takes the chickens at the end of the growing cycle. Poultry contracts are quite detailed, specifying many aspects of the production process. The processor retains legal ownership of the chickens, so the relationship is almost like home-based piecework, in which the grower provides labor and the production site and is paid based on the number of units produced. Part of the rationale for poultry contracting is that the processor is providing specialized inputs and production methods on credit. In Thailand, for example, virtually all commercially produced broilers are produced under contract, whereas the corresponding figure for the Philippines is 80 percent (Delgado et al. 2003).

An alternative to contract farming is vertical integration, in which the buyer owns farmland and engages in direct production of the commodity. In the choice between contracting and vertical integration, an important factor is the existence of economies of scale in production. If large-scale production of the commodity is more economical and large tracts are available for purchase or lease, then processors and exporters are more likely to vertically integrate into direct agricultural production (Minot 1986). This is the case with bananas, pineapples, and sugarcane, for which large-scale production is generally less costly. For example, pest control in banana production often involves aerial spraying, which implies economies of scale. In some countries, it is not possible to purchase or lease large plots of land, preventing processors from vertically integrating into production and forcing them to rely on contract production. In Kenya, Del Monte used to contract with medium-scale farmers to grow pineapples, but when the government made long-term land leases available at concessionary rates, the firm switched from

contract production to plantation production (Minot and Ngigi 2004). Vertical integration has the advantage of tight control over production decisions, but the disadvantages of inflexible productive capacity and high costs of supervising day-wage laborers, who are less motivated than small-scale farmers.

Type of destination market. The third factor is the destination market. The more quality-sensitive the final market and the more demand there is for food safety, the more incentive there is for vertical coordination to increase control over the production process. The same commodity may be sold on the spot market for local rural consumers and grown under contract farming schemes for upscale urban supermarkets and exporters. Some researchers argue that tighter food safety standards in the United Kingdom are creating incentives for horticultural exporters in Kenya to switch from small-scale contract farmers to large-scale contractors and vertically integrated operations because it is difficult for the exporter to monitor and document the production practices of many small-scale farmers (Dolan and Humphrey 2000). In Shandong Province, China, apples for export to Japan are grown by vertically integrated orchards/packing houses, whereas apples for sale to urban supermarkets are often grown under contract and apples for local consumption are sold by farmers to wholesalers in spot markets (Hu 2005).

Another example in which the same commodity is grown with and without vertical coordination depending on the destination market is organic food production. Processors and exporters often establish contract farming schemes to procure organic products, partly to ensure that organic methods are in fact used. In some cases, particularly in developing countries, buyers may contract with farmers as a way of assisting them with organic food production methods. The profitability of organic food production depends, of course, on consumers' willingness to pay a premium that covers both the additional cost of production (due to lower yields) and the cost of monitoring and certifying. For example, although rice is rarely grown under contract, organic rice production is often organized under a contract farming scheme (see Setboonsarng et al. 2006).

A third example is seed production. Seeds must be grown under carefully monitored conditions to minimize the risk of seed-borne diseases, mixture of weed seed, or mixture with other varieties of the same crop. This process involves starting with healthy seed that is varietally pure, monitoring the field closely, controlling weeds effectively, and isolating fields from fields with other varieties, all of which add to production costs. Sometimes seed companies use their own fields (vertical integration), particularly for early generations of seed multiplication. But often they use contract farmers, particularly for the later generations, to reduce the costs of production and achieve larger volumes. Farmers would be reluctant to take these additional measures unless they were assured of a price premium above the price of the food crop (Simmons et al. 2005).

Impact of Contract Farming on Small Farmers

The impact of contract farming on small farmers can be divided into two issues. First, how does contract farming affect smallholders who are participating in the contract farming scheme? Second, do small farmers participate in contract farming schemes, or are they excluded? This section summarizes the results of previous research on these topics.

Impact of contract farming on the income of participating farmers. Economic logic would suggest that well-informed farmers will not voluntarily enter into contracts with buyers unless they believe there will be benefits. Because of the possibility of misperceptions or lack of information, however, it is worth examining the empirical research. Research on contract farming in developing countries is fairly extensive, going back to the 1970s. In an early review of the literature, Minot (1986) finds that most studies suggest that farmers benefit from contract farming because it provides them with inputs on credit, technical assistance, and often a guaranteed price, allowing them to produce a higher-value commodity than would otherwise be possible. Other studies provide a more skeptical view of the benefits of contract farming. Little and Watts (1994) compile a set of seven case studies of contract farming in Sub-Saharan Africa. The case studies focus on the historical and political context of contract farming, conflicts between farmers and the contracting firms, the imbalance of power between the two parties, intrahousehold tensions over the division of labor and the allocation of new revenues, and the increasing rural inequality as contract farmers grow wealthy enough to hire farm laborers. In his summary of the cases, Little (1994, 221) concludes that "incomes from contract

farming increased for a moderate (30–40 percent) to a high (50–60 percent) proportion of participants." This income was not enough to live on, however, and farmers had to rely on other farm and nonfarm income. In several cases, households lost land that was appropriated for government-run contract farming schemes.

In a review of the experience of contract farming in Africa in the early 1990s, Porter and Phillips-Howard (1997) conclude that farmers were generally better off as a result of their participation in contract farming, in spite of a number of social problems that arose in the communities. Singh (2002) identifies a series of problems associated with contract vegetable production in the state of Punjab in India: imbalanced power between farmers and companies, violation of the terms of the agreements, social differentiation, and environmental unsustainability. Nonetheless, his surveys reveal that most farmers have seen incomes rise since joining the scheme and are generally satisfied with the contract arrangement.

There is some evidence that contract farming leads to a sharing of risks between the producer and the purchaser. Birthal et al. (2005) show that, in the case of poultry farmers in India, the coefficient of variation (CV) of the profits of contract farmers is lower than the CV of profits of noncontract farmers. Because there was not much variation in yield, price volatility was the main reason for high variability in profits of independent growers.

Birthal et al. (2005) also examine contract production of vegetables and milk in India. They find that vegetable contract farmers received prices that were 8 percent higher than those received by noncontract growers, and contract milk producers received prices that were 4 percent higher. Other things being equal, agroprocessors find it more advantageous to deal with a small number of larger suppliers of raw materials than with a large number of smaller suppliers. Working with small farmers, however, often has offsetting advantages. Birthal et al. (2005) observe that firms in India often found it more convenient to contract with smallholders and their associations for several reasons:

- lower risk for overall supply in the event of crop failure of one or few farmers;
- higher quality thanks to labor-intensive management; and
- lower costs due to lower implicit wage rates.

Warning and Key (2002) study contract farming in groundnuts in Senegal. NOVASEN, a private company, contracted with 32,000 growers and produced approximately 40,000 tons of groundnuts annually. Warning and Key found that the increase in gross agricultural revenues associated with contracting is statistically significant and large, equal to about 55 percent of the average revenue of noncontract farmers.

Another study, carried out in Indonesia by Simmons et al. (2005), examined contract growers of poultry, seed maize, and seed rice. The contracts for poultry and seed maize resulted in improved returns to capital, whereas no significant impact was found in the case of seed rice. Simmons et al. conclude that the contracts increased income and welfare, reducing absolute poverty.

Ramaswami et al. (2006) studied poultry growers with and without contracts in India. They found that average gross margins were similar between contract growers and others, but the regression analysis indicated significant gains from contracting. The explanation is that contract growers were less experienced and had less access to credit than other growers. Thus, they gained more from the management assistance and the credit provided by the firm than would more capable farmers who already had access to credit. Consequently, the incomes of contract farmers were significantly higher than they would have been without the contract, but only slightly higher than the incomes of the more-skilled independent growers. In addition, the authors also show that the variability of gross margins across production cycles was much lower for contract growers than for independent growers, revealing another benefit of contracting.

Although numerous studies confirm that contract farmers gain from participation, the studies also show that there are frequent violations of the terms of the contract by buyers or farmers. In some cases, market prices rise and farmers try to sell to other buyers, avoiding repayment of the input credit. In other cases, prices fall and the processor buys supplies from the open market, imposing strict quality standards on the contractors to avoid purchasing from them at the agreed price. Since the contracts are generally not legally

enforceable,[3] the only leverage the firm has is to refuse to work with the farmer in the future. Similarly, the main leverage of farmers is to withdraw from the scheme or to bring the case to local officials for intervention. Indeed, an earlier review of the history of contract farming schemes in Kenya indicates a fair amount of turnover, as old schemes collapse and new ones are launched (Jaffee 1994).

Thus, the weight of evidence suggests that successful contract farming schemes generally raise the incomes of farmers who join them. The cases where contract farming does not improve farm income (or at least reduce income volatility) are often short-lived as the scheme collapses.

Participation of small-scale farmers in contract farming schemes. Even if farmers benefit from their contractual relations with processors and exporters, there is still the issue of whether small-scale farmers are able to participate in contract farming schemes. Some critics of contract farming argue that firms tend to work with medium- and large-scale farmers (Little and Watts 1994; Singh 2002). If so, contract farming may be an interesting institutional mechanism for vertical coordination, but it would have less relevance for poverty reduction strategies. In fact, by contributing to income inequality, it may exacerbate tensions between social groups in rural areas. Other things being equal, firms would generally rather work with a small number of larger farmers rather than a large number of small-scale farmers. The transaction costs associated with negotiation, technical assistance, the monitoring of quality, and collection of harvest would certainly be less if the firm works with a smaller number of larger farmers. All other factors, however, are not equal. Most important, the family labor used by small-scale farmers has a lower implicit wage rate than the wage laborers hired by medium- and large-scale farmers. In addition, family labor is better motivated than hired laborers to respond to problems such as disease or pest attack as they occur during the crop cycle.

A number of studies examine the proportion of contract farmers that are smallholders, as an indicator of the pro-poor impact of contracting. Guo et al. (2005) use data from farm-level surveys in China covering several products to estimate the likelihood of participating in a contract farming scheme as a function of household characteristics, crop mix, and farm size. The results show that small farmers are less likely to participate in contract farming than larger farmers.

Key and Runsten (1999) look at contract farming in the tomato-processing industry in Mexico. Multinational agroprocessors from the United States first contracted with large growers but then involved small growers, partly because as a lucrative market for fresh tomatoes developed, firms found it increasingly difficult to enforce contracts they had with larger growers.

In the study of groundnuts in Senegal cited earlier, Warning and Key (2002) compared contract and independent farmers by various measures of assets. They found that indicators of asset ownership were not significant predictors of participation in the contract farming scheme, suggesting that contractors were typical rural households. In the study of contract farming in Indonesia, Simmons et al. (2005) found that contract seed growers had larger farms than independent growers, but contract poultry producers tended to be smaller than independent poultry growers.

A few studies give examples of buyers shifting from small-scale to large-scale farmers or the reverse. One example, cited in World Bank (2006), is an exporter in Thailand that started producing its own horticultural products on company land and later shifted to smallholder contract production. Minot and Ngigi (2004) describe the evolution of several contract farming schemes in Kenya, including one (Del Monte pineapple) that gave up on contract production and shifted to vertically integrated plantation production. Others have shifted from large-scale to small-scale production. In Senegal, green bean exporters switched from small-scale contract production to large-scale contract production (Maartens and Swinnen 2006). These findings confirm that the comparative advantage of smallholders is not a static concept, but it can change as farmers and buyers experiment and learn from experience. One study in Costa Rica found that younger, less experienced growers were more likely to grow under contract (Saenz and Ruben 2004). The fact that contract farming schemes occasionally switch from large-scale to small-scale farmers suggests that the cost differences between them is small, which implies that public policy may

[3] Although the contract may be legally binding in theory, it is often not worthwhile to either party given the high cost of bringing the case to court relative to the value in dispute.

be able to play a role in encouraging the participation of small farmers in these supply chains.

Stakeholders

Contract farming involves at least five types of stakeholders. This section examines the interests and motivations of each stakeholder.

Contracting Firm

The contracting firm is usually a medium- or large-scale processor, exporter, or supermarket chain. One of the firm's main interests is in obtaining a steady flow of high-quality agricultural products at the lowest price possible.[4] It faces difficult decisions: it is easier to work with a small number of large farmers, particularly if they have the financial and technical resources to produce a high-quality product throughout the year. On the other hand, large-scale farmers may be harder to bargain with (particularly if they organize themselves), and the firm may be wary of becoming too dependent on them. It may face political pressure from the government to show that it is working with small farmers and helping promote rural development. The firm also faces competitive pressures from other buyers of the commodity, who may try to divert the contracted output, and from others in the same sector, who may undercut their prices. And a constant source of risk is the fact that one highly publicized case of food poisoning could put their entire business strategy at risk.

Participating Farmers

Farmers who participate in a contract farming scheme generally do so of their own volition, but there are frequent sources of tension with the contracting firm. Some farmers may suspect that the quality of inputs is poor. Others may be confused or suspicious of the criteria used by the firm to grade their harvest, because the grade determines the price the firm will pay. When market prices are high, farmers may be tempted to sell some of their harvest on the open market, but they risk losing their place in the scheme if discovered. There may also be concern about the possibility that the firm will start to contract with a different set of farmers who can undercut them or offer better quality. Alternatively, the firm could decide to vertically integrate by leasing land and growing its own product with hired laborers.

Nonparticipating Farmers

Farmers who do not participate in a contract farming scheme may envy the access to inputs, credit and the guaranteed market that participating farmers enjoy. At the same time, they may be unsure if it is worth joining given some of the complaints they hear about the company. More commonly, they may not be able to join the scheme because of some criteria established by the firm regarding location, farm size, irrigation, assets, and/or literacy. Still other farmers may have been contract farmers in the past but left the scheme, either because they believe they have the skills to market the product themselves or perhaps because they were caught selling on the side and lost the contract.

Government

Government officials are generally pleased to have a formal-sector agribusiness firm because it generates tax revenue and may contribute to exports. Furthermore, the firm creates employment and shows that the government is addressing the problems of rural areas. At the same time, the firm may frequently pressure the government for extensions on its tax concessions, for better roads to the factory, and for more reliable electricity. For a given size of operation, government officials would generally prefer that the firm work with more small-scale farmers and pay better prices, but they are also aware that if costs rise too much, the firm may relocate its operations to another country where labor costs are lower.

Farmer Organizations or Nongovernmental Organizations

Often a cooperative, farmers' organization, or nongovernmental organization (NGO) plays the role of intermediary between farmers and the company. This arrangement has the potential to reduce the transaction costs for the firm in communicating with farmers, distributing inputs, and collecting the harvest. NGOs are often involved in farmer training and input delivery, whereas cooperatives and farmer organizations are more likely to be involved in collecting the harvest for the company and other organizational tasks. The organization tries to represent the interests of farmers to the company

[4] Firms may have other motives as well. Seed companies often contract seed multiplication in order to control the intellectual property embodied in the seed variety.

to get better prices or clearer rules on grading. But it also realizes that, if it pushes too hard, the company could choose to work directly with farmers, cutting the organization out of the system, or it could work with farmers in other districts.

Policy Options

Developing countries can promote pro-poor contract farming by creating a conducive policy environment. In particular, the following policy goals should be considered:

- a favorable investment climate;
- deregulation of direct transactions between companies and farms;
- development of grades and standards;
- facilitation of farmer organizations to link farmers and firms;
- cooperation with private firms on provision of extension services;
- promotion of competition;
- provision of mediation services; and
- exploration of innovative ways to enforce contracts.

Improve the Investment Climate

As already discussed, contract farming schemes are usually organized by large-scale processors, exporters, or chains of supermarkets. Thus, an investment climate that facilitates private investment in agribusiness sectors is a necessary precondition for the development of private contract farming schemes. This improved climate involves reducing unnecessarily high capital requirements to start new firms, streamlining registration procedures, limiting licensing requirements to sectors in which public health or safety is an issue (such as pesticide distribution), developing a fair and transparent tax code, simplifying customs clearance procedures, adopting a modern commercial and legal code, and minimizing corruption.

Legalize Direct Firm-Farm Contracts

The government can facilitate contract farming and other forms of vertical coordination by removing legal restrictions that prevent firms from buying directly from farmers in some countries. Although designed to protect farmers' interests, these regulations often serve only to impose the use of an intermediary organization, such as a cooperative, which may increase marketing costs. The government's role should be to ensure that both parties to an agreement understand and accept the terms.

Develop Effective Grades and Standards

The establishment of grades and standards that are easy to implement and that reflect attributes demanded by consumers will facilitate communication and negotiation between buyers and farmers and among traders. It will also make it easier for buyers to establish contracts with farmers, given that quality control and grading are often contentious issues in farmer-buyer relations within contract farming schemes. The government may also have a role in certifying compliance with private grades and standards, such as EUREGAP, a set of standards developed and adopted by a consortium of European supermarkets.

Facilitate Farmer Organizations and Other Intermediaries

Contract farming schemes involving large numbers of small farmers often make use of an intermediary organization. A cooperative, an NGO, or even a large-scale farmer may serve as a link between the firm and small-scale farmers. The activities of local officials and extension agents can play a role in allowing and even promoting the development of such intermediary organizations, which reduce the transaction cost associated with dealing with a large number of small farmers. The organizations should, however, involve voluntary membership by farmers and voluntary contractual relations with firms to ensure that they are productive.

Promote Public-Private Partnerships in Extension

Traditionally, extension services have concentrated on providing technical assistance in the production of staple crops. As farmers diversify into high-value commercial crops, extension services must adapt by providing assistance on a wider range of crops and by providing more marketing assistance. Contract farming schemes often use cooperatives, NGOs, extension agents, and local officials as intermediaries. If extension services have the flexibility to provide services on behalf of the contracting firm and the incentive to serve small-scale farmers, it reduces the cost to the firm of working with small-scale farmers. Of course, the rationale for

providing extension services is stronger if the scheme is working with small-scale contract farmers.

Promote Competition

One of the biggest concerns about contract farming is the fact that firms seem to have much greater market power and leverage than do the farmers who bargain with them. One of the best approaches for limiting this power is to allow or promote competition among firms. Policymakers should be reluctant to offer regional monopsony power that agribusiness firms sometimes seek.[5] This practice is particularly common in the cotton and sugarcane sectors. At the same time, it is important to recognize that competition makes it easier for farmers to obtain inputs and credit from one company and then sell the harvest to another company, thus avoiding repayment of the loan. There are, however, better methods of enforcing contracts than by granting regional monopsonies.

Provide Mediation Services

One of the most common problems in contract farming is violation of the contract. If the market price rises during the agricultural season, farmers are tempted to sell to other buyers, particularly since doing so means they can avoid repaying the input credit. On the other hand, if the market price falls, the buyer is tempted to procure raw materials on the open market. The buyer may apply quality standards more strictly under such circumstances, reducing its obligation to purchase from contract growers. If these abuses are widespread, they can lead to loss of confidence and possibly the collapse of the contract farming scheme. Government officials, particularly extension officers, sometimes play a role in mediating between contract growers and the buyer. Alternatively, they could help organize a nongovernmental mediation board with members acceptable to both sides. This is an area where there are no clear, widely applicable models, but one that deserves more attention.

Enforce Contracts

The government should explore alternative approaches to enforcing contracts, particularly between buyers and farmers. In countries with more advanced legal systems, this enforcement could be accomplished by establishing small-claims courts. In other countries, it may involve collecting and disseminating information on noncompliance on the part of both farmers and buyers. Providing better information about noncompliance will increase the incentives for farmers and firms to comply and help each party avoid high-risk business partners. In Benin the government has established a clearinghouse for information on farmers who are producing cotton and receiving inputs on credit. This information makes it easier to punish both the farmer who violates the terms of his or her contract and the buyer who knowingly purchases cotton from growers who have contracts with other companies.

Assignment

Your assignment is to recommend a set of policies to be considered by a developing-country government to facilitate contract farming for fruits and vegetables that will benefit low-income farmers, taking into account stakeholders' interests.

Additional Reading

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[5] Monopsony refers to a situation in which there is only one buyer of a commodity, in contrast to a monopoly, where there is just one seller.

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Chapter Four
Smallholder Farmers' Access to Markets for High-Value Agricultural Commodities in India (6-4)

by P. S. Birthal and P. K. Joshi

Executive Summary

Sustained economic and income growth, a fast-growing urban population, and the increasing integration of global agri-food markets are fueling rapid growth in demand for high-value food commodities in India. This is an opportunity for farmers, especially smallholder farmers, in India to augment their incomes and use surplus family labor in the production of high-value, labor-intensive food commodities. The transition to high-value agriculture, however, is unlikely to be smooth. One of the major impediments is smallholders' lack of access to markets for high-value commodities. Local rural markets are thin, and trading in distant urban markets is not remunerative owing to high transportation and transaction costs. Besides, they also face problems in gaining access to credit, high-quality inputs, improved technology, information, and services.

Improving smallholders' access to markets requires close linkages between farmers, processors, traders, and retailers to coordinate supply and demand. Institutions such as cooperatives, producers' associations, and contract farming are important means of linking producers with markets, as well as a source of credit, inputs, technology, information, and services. But there is concern that smallholders may be excluded from the institution-driven value chains. Agribusiness firms, to reduce the transaction costs of contracting with a large number of smallholders, have tended to contract with a few large producers who can supply large volumes and are capable of complying with food-quality standards. There is also a fear that agribusiness firms may exploit smallholders by extracting monopsonistic rent in the output market and manipulating the terms and conditions of contracts.

Nonetheless, there is growing evidence that the advantages associated with institutional marketing outweigh its disadvantages. Policy makers should therefore create a level playing field to allow for the growth of the right kind of market institutions, promote competition among various market players and institutions, protect smallholders from institutional exclusion and unscrupulous trade practices, and support them with credit, insurance, technology, and services to improve their competitiveness and ensure food safety for consumers. Policies should also focus on improving public infrastructure that generates widespread economic benefits.

Your assignment is (1) to compare advantages and disadvantages of cooperatives, producers' associations, and contract farming, and (2) to identify required government policies and other conditions for the success of these institutions, focusing on social, economic, and political and legal aspects.

Background

The Relevance of High-Value Agriculture to Smallholders

Smallholders[1] are a big deal in India. In 2002/03, out of 101 million farm households, 86 percent had landholdings of less than or equal to two hectares (ha), with an average holding of 0.53 ha per household. Furthermore, smallholders are multiplying rapidly. Since 1971/72 their number increased 2.25 times, whereas the average size of their holdings declined by 45 percent. How long can they survive on such tiny landholdings? Should they exit agriculture, or should they work to enhance their agricultural income by intensifying or diversifying their production with more remunerative activities

[1] There is no universally accepted definition of smallholders. Generally, farm classes are defined in terms of the amount of land or livestock a household possesses. Furthermore, the cut-off point for categorizing a farm household as a smallholder varies depending on the scarcity or abundance of these resources. For more details, see Narayanan and Gulati (2002). In India farm classification is based on landholding size, and a household possessing less than two hectares of land is classified as a smallholder (see Government of India 2006).

like horticulture, dairying, poultry, and fisheries? The opportunity to exit agriculture appears to be limited given that past trends for transferring labor from agriculture to other economic sectors are not encouraging. Between 1972/73 and 2004/05, the share of agricultural employment in total employment declined from 74 percent to 57 percent.

In view of the slow transfer of labor out of agriculture, diversification of agriculture out of staples and toward high-value food commodities appears to be an important pathway for smallholders to augment their income and escape poverty. High-value enterprises have strong potential to raise returns to land, labor, and capital inputs. Enterprises such as vegetable production and livestock rearing have short gestation or generation intervals and produce quick and continuous flows of output. Horticultural crops generate as much as seven times more income per unit of land compared with cereals (Joshi et al. 2004). Vegetable production requires two to seven times as much labor as cereals (Weinberger and Lumpkin 2005), and smallholders have abundant labor. There is also a possibility that labor may substitute for capital inputs—for example, manual weeding can replace the use of herbicides or tractors. Although high-value food production can require a greater amount of start-up capital, some activities, like vegetable production, small-scale dairying, and poultry raising, can be initiated and developed with relatively little capital.

Production of high-value commodities can make an important contribution to rural poverty reduction. The literature on the agriculture-poverty nexus identifies agricultural growth as the main cause of poverty reduction in many developing countries. In India the high-value food sector (fruits, vegetables, milk, meat, eggs, and fish) contributes nearly half of agricultural income and has been growing at almost twice the rate of the rest of the agricultural sector (Birthal and Joshi 2006). Besides, the distribution of high-value enterprises such as dairying, poultry, and small ruminants is skewed toward smallholders, suggesting that high-value agriculture can make a significant contribution to poverty reduction. There are numerous other examples where smallholders could escape poverty through the production of high-value agricultural products.

Another significant feature of high-value agriculture is that it is pro-women. Women perform a number of activities related to production and postharvest of high-value commodities. For instance, 76 percent of the labor required in dairy, 62 percent in poultry, and 44 percent in horticultural production in India is supplied by women, compared with 37 percent in the case of foodgrains (Birthal et al. 2006). Similar situations have been documented in many developing countries (Dolan and Sorby 2003).

Market Opportunities in High-Value Agriculture

Demand for high-value food production in the domestic as well as international markets has been increasing rapidly. The food basket in India has undergone a significant change over the past two decades or so. Between 1983 and 1999, per capita consumption of high-value food products increased by 24 to 39 percent, compared with a 16 percent decline in cereal consumption (Mittal 2006). Furthermore, this shift in the consumption pattern is not confined to high-income consumers, but is widespread. The percentage increase in the consumption of high-value food commodities has been higher among households at the lower end of the income distribution, owing to Engel's Law. Multiplying these changes by the rise in population translates into huge increments in demand growth for high-value food products.

The growth in domestic demand for high-value food products was triggered by rapid economic and income growth, increasing urbanization, changing consumer preferences, and unfolding globalization (Birthal et al. 2006). For the past two decades the Indian economy has been growing at an annual rate of more than 6 percent, per capita income at 4 percent, and the urban population at 3 percent. These economic and demographic changes are considered robust and are likely to continue in the near future, implying further expansion in the demand for high-value food products.

The global market for high-value food commodities is also expanding fast (Aksoy and Beghin 2005). The share of fruits and vegetables in world agricultural trade, for example, increased from 14 percent in 1981 to 19 percent in 2003. In India high-value food products (fruits, vegetables, dairy products, meat, eggs, and fish) accounted for 35 percent of total agricultural exports in 2003, up from 24 percent in 1981 (Birthal et al. 2006). Fish and fish products are the largest component of high-value exports (50 percent), followed by fruits and vegetables (35 percent). Annual growth of high-value food exports during this period was 4.4

percent, compared with 3.5 percent in total agricultural exports. The faster growth in exports of high-value food products presents an opportunity for smallholders to participate in global markets.

Barriers to Smallholders' Access to Markets

Can smallholders benefit from the expanding markets for high-value food commodities? The production and marketing requirements for high-value food commodities are much different than for staple foods. Production of most high-value food commodities is capital and information intensive, and because these products are perishable, they are prone to higher market and price risks. Moreover, smallholders are constrained by a lack of access to capital or credit, improved technologies, high-quality inputs, information, services, and risk-mitigating mechanisms.

Lack of access to markets for high-value food commodities is a major impediment to small farm diversification toward high-value food commodities. The perishability of high-value food commodities necessitates their immediate transfer to consumption centers or markets or transformation into less perishable products. Local rural markets for high-value food commodities are thin, and the marketable surplus of individual smallholders is too small to be traded economically in distant urban markets owing to high transportation and transaction costs. The transportation and marketing costs associated with open market sales of milk and vegetables in India eat up as much as 15 percent of farmers' gross revenue (Birthal et al. 2005). Some of these costs are fixed and, owing to a lack of scale economies, are higher for smallholders. In addition, compared with foodgrains, high-value food commodities are prone to higher price risks. Their prices are volatile and drop significantly when supply in the market is just slightly above normal.

Lack of infrastructure such roads, refrigerated transport, and cold storage is an important barrier to farmers' participation in the production and marketing of high-value food commodities. Evidence shows that the spread of high-value agriculture is poor in areas with poor road networks (Parthasarathy Rao et al. 2006). A lack of road connectivity leads to delays in transferring produce to market centers, quantitative and qualitative losses in farm produce, and higher transportation and transaction costs, which act as a disincentive to farmers and agroprocessors to invest in high-value agricultural production and processing.

Although the globalization of agri-food markets presents an opportunity for farmers to participate in these markets, globalization is accompanied by increasing demands for food safety, quality, traceability, and compliance. Meeting these requirements is a big challenge for farmers, processors, and exporters. Food safety and quality concerns are also echoed by the organized food retail chains in domestic markets. Lack of compliance with food safety and quality standards may exclude smallholders from the quality-driven supply chains.

Institutional Innovations Linking Farmers to Markets

For smallholders to benefit from the growing market opportunities, close linkages between farmers, processors, traders, and retailers are needed to coordinate supply and demand. Vertical coordination of agri-food markets through institutions like cooperatives, producers' associations, and contract farming can help create such linkages. These institutions, if managed well, can provide several benefits to farmers besides access to markets. The major benefit consists of reduced transportation and transaction costs. Farmers also benefit from the provision of high-quality inputs, improved technologies, credit, insurance, and support services from the processing or marketing firms provided as a part of contracts.

These institutions are not, however, free from criticism. Although cooperatives and producers' organizations offer the benefit of collective strength, friction and disputes among the members can mar the spirit of cooperation. Contract farming is viewed as a partnership between unequal partners, and there is always scope for exploitation of the weaker party—that is, the farmers. The agribusiness firms may extract monopsonistic rents in the output market and manipulate the terms and conditions of contracts to the disadvantage of farmers. Another important argument against contract farming is that agribusiness firms, to reduce the transaction costs of contracting with a large number of smallholders, tend to select large farmers who are capable of supplying sufficient quantity and complying with food safety and quality standards.

Nonetheless, India is witnessing a revolution in institutional innovations linking farmers with markets (Box 1). Cooperatives among sugarcane and dairy producers have long existed. Producers' associations for marketing fruits are emerging in their

niche production regions. And now, with enabling market liberalization policies, contract farming is becoming a preferred method for the sourcing of raw materials by agri-business firms, organized food retailers, and exporters.

Box 1: The Institutional Revolution in High-Value Agriculture: The Case of Poultry Production

Until 1991, contract farming in poultry was almost nonexistent in India. Although poultry production was booming, a disease outbreak in the mid-1990s in the southern part of the country—the heart of the poultry industry—forced many smallholders to exit poultry production. This production decline affected not only producers, but also hatcheries and the feed industry. Consequently, a few leading firms in the poultry business initiated contract farming with farmers who had closed their farms. The obvious advantage was that these farms had infrastructure and skills in poultry production and required only operational capital, which these firms provided in the form of chicks and feed. The farmers were provided with guaranteed income in the form of fixed growing charges, which acted as insurance against market risks. Today, contract farming is widely practiced in both broilers and layers; about 40 percent of India's poultry production takes place under contracts, and in some southern and western states the share is more than 70 percent.

The literature on contract farming identifies three types of contracts: market specification, resource-providing, and management contracts.[2] All these contractual arrangements exist in India in varying intensity. Market specification contracts, as pre-harvest contracts, are widely prevalent in horticultural crops like mango, banana, apple, litchi, grape, arecanut; management contracts are quite common in poultry; and resource-providing contracts are observed in most of the commodities.

Within the broad framework of market specification, resource-providing, and management contracts, a contract could be bipartite or multipartite, depending on the commodity, the resource base of the producers, and the capacity of the agribusiness firms. A bipartite contract is a direct contract between a producer or group of producers and an agri-business firm. Poultry contracts in India are mostly bipartite management-type contracts. Multipartite contracts involve not only farmers and agri-business firms, but also many other stakeholders such as financial institutions (credit and insurance), input manufacturers, and service providers. Given the poor resource endowments of smallholders, multipartite contracts are becoming important in India. Further, the practice of subcontracting is widely prevalent both in bipartite and multipartite contract systems. In this case, the firm enters into an agreement with a local villager to obtain a commodity supply on a commission basis. The local villager acts as an intermediary between the firm and the producers in terms of procurement of the produce and distribution of inputs and services. In a smallholder-dominated agrarian economy, such an arrangement reduces the firm's transaction cost of contracting with a large number of smallholders and also spreads risk. These contracts are common in dairying.

Empirical evidence on the profitability of contract farming is scanty, yet the available data show that farmers, both large and small, benefit from these arrangements (Birthal et al. 2005; Kumar 2006). Table 1 shows the percentage difference in costs, price, and net revenue between contract and independent production of milk, broilers, and spinach.[3] With contracts, dairy and spinach producers can

[2] Under a market specification contract, a farmer commits to sell his produce to the agribusiness firm at a fixed price or at the market price prevailing at the time of harvest. Under a resource-providing contract, the agribusiness firm provides inputs, technology, and services to the farmer against his commitment to supply a stipulated amount of produce. Under a management contract, the agribusiness firm not only provides resources but also has strict managerial control over the farmer's decisions and guarantees a minimum income to the farmer.

[3] Contracts in dairy are of two types: (1) direct contracts with large producers, and (2) subcontracting with small producers through agents. Broiler contracts are management-type contracts. In the case of spinach, contracts are through producers' associations. For details, refer to Birthal et al. (2005).

Table 1: Unit Cost, Price, and Net Revenue of Contract Farmers Compared with Those of Noncontract Farmers (%)

Item	Milk	Broilers	Spinach
Cost of production	-2.5	-	-8.9
Marketing and transaction cost	-93.1	-57.8	-92.0
Total cost	-10.2	-	-26.5
Price	3.8	-	7.7
Net revenue	100.5	12.6	77.9

Source: Birthal et al. 2005.
Note: Dashes signify that the data are not comparable.

realize as much as 78–100 percent more net revenue than their independent counterparts selling in the open market. The major benefits accrue from reduced transportation and transaction costs. With off-take of the produce at the farm gate assured, contract producers can save on transport, travel, and labor costs. Because they are provided with inputs (at market prices) and free technical services at their doorstep, they also save on the cost of acquiring these goods and services. There is no significant difference between the contract price and the market price, although the contract price is marginally higher for both milk and spinach. Thus it does not appear that agri-business firms tend to extract monopsonistic rent in the output market and monopolistic rent in the input market.

Broiler contracts are management-type contracts. The agribusiness firms provide day-old chicks, feed, vaccines, medicines, and services and thus bear about 90 percent of the variable cost, which in a sense is an interest-free credit to producers. The producers are provided with a guaranteed income (in the form of fixed growing charges for birds based on body weight) for their contribution to production cost. This system eases farmers' capital constraints, insulates them from market and price risks, and provides stable income (Ramaswami et al. 2006). Since there is a trade-off between risk and returns, contract farming in broilers is not as profitable as in milk and spinach.

Marketing and transaction costs are higher for smallholders, and thus they are expected to benefit most from institutional arrangements. The question, however, concerns their participation in these arrangements. Evidence in this regard is mixed. In the cases presented in Table 1, 56 percent of dairy producers had fewer than 5 dairy animals, 51 percent of spinach producers had farms smaller than 2 ha, and 32 percent of broiler producers had fewer than 5,000 birds per crop. In contract farming of gherkins, Erappa (2006) found more than 50 percent of farmers had less than 2 ha of land. On the other hand, Kumar (2006) found very little involvement of small landholders in contract farming (15 percent) in crop production in general.

Policy Issues

In India smallholders (with landholdings of less than 2 ha) make a significant contribution to the production of high-value food commodities (Birthal and Joshi 2006). They control 61 percent of the total area under vegetables and 52 percent under fruits, compared with their share of 44 percent of arable land. Most smallholders do not, however, practice high-value agriculture on a commercial scale; only 16 percent of them grow vegetables, and of these farmers 60 percent allocate less than 20 percent of their area to vegetables owing to lack of market access. Production on such a tiny scale might offer nutritional benefits to them, but the lack of access to markets largely eliminates cash benefits. The major policy issue is therefore how to connect them with regional, national, and international markets.

Agriculture in India is a state subject. The marketing of agricultural produce is governed by the state-specific Agricultural Produce Market Committee (APMC) Acts, which until recently restricted commercial transactions in agricultural commodities outside the state-designated markets. Under its economic reform program, the central government

came with a new Model Agricultural Marketing Act in 2003, which allows allow agribusiness and marketing firms to source their raw materials directly from farmers through contracts or other arrangements. The implementation of the Model Agricultural Marketing Act, however, rests with state governments, and progress has been slow, acting as a disincentive for agribusiness firms to invest in marketing and processing infrastructure and thus slowing the upscaling of contract farming.

A related issue concerns regulation and legal protection of contract farming. The Model Agricultural Marketing Act has regulatory provisions but does not provide any legal teeth for resolving conflicts and disputes between the parties involved, on the grounds that legal procedures could be lengthy and complex. Nevertheless, contract farming is growing rapidly, and the need for legal protection cannot be ruled out.

Downstream from this vertical coordination, a significant change is taking place in India's food retailing system in the form of the rise of supermarkets. A number of large business houses have entered organized food retailing. This move is likely to have a significant impact on food procurement, as well as on traditional retailing systems. Supermarket chains are quality-driven. There is concern that smallholders may be unable to meet supermarkets' quantitative and qualitative requirements and thus may be displaced from the high-value market segment. There is also concern that the rise of supermarkets in food retailing could displace millions of workers in the unorganized retail food sector. On account of these concerns, India prohibits foreign direct investment in multibrand retailing. It is also feared that foreign investors may import goods into India, which could be detrimental to domestic producers.

The food-processing industry is underdeveloped and lacks investment. Only about 2.2 percent of fruits and vegetables, 6 percent of poultry meat, 21 percent each of fish and buffalo meat, and 35 percent of milk undergo value addition (Government of India 2005). This low level of processing results from both demand- and supply-side factors. Prices of processed foods are high owing to the high cost of packaging and taxes.[4] Moreover, the food-processing industry lacks scale economies. Improving the scale of processing requires huge capital expenditures and investments in technology to allow industry to compete in global markets.

With rising incomes and access to information, consumers are becoming increasingly conscious of food safety and quality. High-value food commodities are more prone to food-safety issues at every stage of the value chain. Unfortunately, the cost of complying with food safety demands is exorbitant owing to required higher initial investments in machinery and equipment, certification procedures and labeling, and monitoring and enforcement costs at the farm level (Mehta et al. 2007).

An important issue that has attracted considerable attention from policy makers concerns the tradeoffs between high-value crops, food security, and natural resources. Some observers fear that diverting land from staples to commercial cultivation of high-value crops may adversely affect household food and nutrition security. Besides, there is an argument that high-value crops require more irrigation water, fertilizers, and pesticides and thus could lead to a deterioration of natural resources. There are counterarguments to these (Birthal et al. 2006), but this debate creates a dilemma for policy makers.

Stakeholders

Stakeholders on the supply chain for high-value food products can be broadly categorized as producer-sellers (individual or collective), buyers (commission agents, wholesalers, institutional buyers, processors, exporters, and retail chains), consumers, input manufacturers, and service providers (financial institutions, extension agents, agricultural research institutions, packers, and transporters). All these stakeholders have different interests, some of which are complementary and others of which are conflicting.

Producers are the primary stakeholders. Their main interest is to have an assured and remunerative market for their produce, and they will benefit the most from institution-driven supply chains. Assured access to markets lowers marketing and transaction costs, reduces price risks, and acts as an incentive to improve scale of production.

Agroprocessors, organized retailers (supermarkets), and exporters are important key actors in creating

[4] For most horticultural products, packaging costs vary between 12 and 20 percent of the total cost, and tax incidence ranges between 15 and 21 percent.

new markets for high-value food products. Institutions like contract farming enable them to have quantitative and qualitative control over raw material procurement and to use their installed capacity, infrastructure, and labor force more effectively. Their main interest is to expand business by capturing emerging opportunities in the high-value sector. The level of food processing, as well as organized food retailing, in India is low, but rising demand for high-value foods offers immense opportunities to them in agriculture and agribusiness. At present, the supply chain for high-value food commodities is long and dominated by a number of intermediaries such commission agents, wholesalers, and unorganized retailers. Vertical coordination through institutional mechanisms would lead to increased competition in procurement and retailing systems, benefiting both producers (through reduction in market risks) and consumers (through lower prices and better quality). On the other hand, vertical coordination might squeeze the profits of traditional stakeholders like commission agents, wholesalers, and unorganized food retailers.

High-value agriculture requires capital, improved technology, high-quality inputs, information, and services, and many farmers lack access to these. The new marketing institutions create enormous potential for financial institutions, input manufacturers, and technology, information, and service providers to integrate themselves into the supply chain through links with agribusiness firms and farmers.

As stakeholders, the central and state governments should create a level playing field for the growth of new market institutions, promote competition among various market players, and enact regulations and legislation to ensure food safety for consumers. They should also encourage smallholders to form producers' associations to deal with agribusiness firms; this step can help them avoid being excluded from markets and improve farmers' access to credit, insurance, technology, information, and support services to improve competitiveness. In addition, the government's role in providing public infrastructure, such as roads, electricity, and communication, that generates widespread economic benefits is of utmost importance.

Policy Options

Three critical elements that need a policy focus are (1) physical infrastructure (such as roads, electricity, and communication) that connects smallholders to consumption centers and markets; (2) institutions that reduce marketing risks and transaction costs and provide inputs, technology, information, credit, insurance, and support services; and (3) investment in food processing.

For perishable commodities, access to high-quality and cost-effective transportation is essential to reduce marketing risks and transaction costs for both sellers and buyers. Hence, governments should increasingly invest in rural roads and other means of transportation, especially in remote areas that have favorable environmental conditions for production of high-value commodities but lack market access.

There is also a need to invest in electrification, which is a prerequisite for production, postharvest storage, and processing of high-value commodities. In this age of the information revolution, electricity is also crucial for the effective use of technologies to retrieve and transmit information on production and postharvest technologies, management practices, prices, and markets. This issue raises the role of information and communication technologies. Lack of access to information is an important limitation to commercializing high-value agriculture. An uninterrupted supply of electricity and information, by reducing unit production costs and transaction costs, will improve competitiveness in production, marketing, and processing.

Investment in public infrastructure triggers private investment in cold storage, refrigerated transportation, market infrastructure, and processing, which are essential to stimulate production of high-value food commodities. Unfortunately, both public and private investment in such infrastructure is inadequate to cope with the ongoing revolution in the high-value food sector. For instance, the available cold storage capacity in India can accommodate barely 10 percent of the horticultural produce (Birthal et al. 2005). Chilling and storage facilities for milk and meat are grossly lacking.

An enabling policy environment is also needed to enhance private sector participation in agri-food markets. Some important issues that need policy attention include reduction of regulatory barriers

such as the multiplicity of regulatory and licensing authorities, increased flow of credit to processors and exporters, and reduction of the multiple taxes on processed products.

The Government of India allows foreign direct investment (FDI) in food processing, but cumbersome procedures and lack of infrastructure hinder this investment. Presently, food processing accounts for only 4 percent of total FDI. FDI in food retailing is not allowed except in single-brand retailing. FDI can promote high-value agriculture by creating new markets for processed foods, improving scale economies, and linking farmers to export markets.

Globalization is creating opportunities to export high-value food products but is accompanied by stringent food safety and quality standards. To exploit these opportunities, India must promote public-private partnerships to develop and improve quality standards, build food-testing laboratories, set up export promotion zones, and equip farmers with best production practices.

Diversification toward high-value food commodities is demand-driven and sets a demand-driven agenda for agricultural research. The research should target the development of crop varieties and production practices that satiate consumers' tastes, preferences, and food safety requirements. In addition, research should focus on developing crop varieties and products that are suitable for processing (taking into account, for example, size, color, shelf life, and chemical composition) and that make use of cost-effective processing technologies.

Given an appropriate macroeconomic policy framework, farmers would benefit the most if the supply chain is squeezed to reduce marketing costs and margins and if farmers are provided with high-quality information, improved technologies, credit, information, and risk-mitigating instruments. These goals could be met if agribusiness firms establish strong backward linkages with farmers through institutions like cooperatives, producers' associations, and contract farming. Governments should therefore facilitate the upscaling of such institutions by accelerating the process of agricultural market reform and demonstrating the benefits of these institutions to farmers.

Institutional reforms should be accompanied, however, by appropriate regulations and legal instruments that protect producers from unscrupulous trade practices. Two important issues here relate to (1) the monopsonistic power of agribusiness firms, and (2) exclusion of smallholder farmers from the market. Governments must recognize these possibilities and ensure that contracts are transparent, unbiased, and not disadvantageous to producers.

Global experience reveals that agribusiness firms tend to exclude smallholders from such institutions. Although Indian agriculture is numerically dominated by smallholders, the distribution of land is highly inegalitarian; 35.6 percent of the land is controlled by 5.2 percent of farm households. Thus, it is not difficult for firms to find large landholders and contract with them to supply high-value agricultural commodities. The best option to ensure that smallholders are not excluded and exploited is to encourage them to join together in producer organizations, which should be supported by policy instruments such as provision of subsidized credit and insurance, extension services and information, and communication technologies.

Assignment

Cooperatives, producers' associations, and contract farming are important means of improving smallholders' access to markets for high-value food commodities. Their success, however, has varied across commodities and locations. Your assignment is (1) to compare the advantages and disadvantages of cooperatives, producers' associations, and contract farming; and (2) to identify required government policies and other conditions for the success of these institutions, focusing on social, economic, and political and legal aspects.

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Chapter Five
Small-Farm Access to High-Value Horticultural Markets in Kenya (6-5)
by Joseph Dever

Executive Summary

The goals of poverty alleviation and rural agricultural development have long been elusive among poor Sub-Saharan Africa countries. Rural areas still lag behind urban ones in economic growth, and formerly lucrative export cash crops such as coffee and tea are no longer as profitable to the average small farm. Rural population growth and environmental degradation have made the challenge of developing the agricultural sector even more difficult.

It is in the context of these challenges that many have championed the expansion of the export horticultural sector to provide a significant boost to the rural economy and permit the participation of the small farm sector. In Kenya the development of the export fresh fruit and vegetable (FFV) and flower industries has been a clear success in private sector–led industry development, with significant gains accruing to participants at all levels along the FFV value chain. As the sector has grown over the past 20 years, changes in the industry have resulted in significant consolidation at all levels and in the exclusion of small farms from the industry, threatening the sector's ability to deliver poverty alleviation to its most vulnerable participants.

Many factors led to the consolidation of the export FFV industry in Kenya, including (1) the increased involvement of European Union (EU) supermarket chains in procuring FFVs directly from farms in Kenya, (2) competitive pressures to cut costs and increase supply chain efficiency among exporters and importers, (3) increased consumer and regulatory demands for more stringent production and food safety standards, and (4) the inability of small farms to gain access to credit, market information, cost-effective transportation, and drip irrigation technology necessary for high-value market participation. As small farms, traders, and exporters have been forced out of the export sector, the supermarket importers, commercial exporters, and large commercial farms that remain have strengthened value chain governance. There may still be a role to play for smaller, less well capitalized, and less management- and technology-intensive farmers, but barriers to successful participation by these entities remain high.

Many in the international development and humanitarian fields are concerned about the exclusion of poor, small farm households from high-value market opportunities and are seeking ways to increase participation of small farms and to encourage more broad-based dispersal of the benefits and successes of this industry. Recent studies have shown that the rural poor, particularly landless families and young women, can benefit greatly from participation as labor on farms or in processing sheds (McCulloch and Ota 2002). In the interest of maintaining competitive participation of small farms in the sector, others have promoted the benefits of contract farming practices and the organization of small farms into farmer marketing associations or cooperatives (Masakure and Henson 2005).

Thus far, the Kenyan government has not been heavily involved in regulating or promoting the export FFV sector. It could play a greater policy role in order to strengthen the global competitiveness of the industry and to enable greater participation of the rural poor in this sector, with the ultimate goal of increasing the broad-based benefits of the export FFV sector for economic growth and poverty alleviation.

Your assignment is to make recommendations to the Kenyan government on what policies should be pursued to enable the FFV export industry to make a greater contribution to the alleviation of rural poverty in Kenya.

Background

The Need to Increase African Exports

Over the past three decades Sub-Saharan Africa's (SSA) share of world exports declined by 60 percent, from 3.1 percent of world exports in 1955 to only 1.2 percent in 1990. In the 1980s

developing-country governments encouraged the expansion of export-oriented agricultural sectors for several reasons: (1) as a means to accelerate rural economic development, (2) to promote poverty relief in rural areas, and (3) in response to the pressures to liberalize their economies though export-led growth, as part of the structural adjustment programs encouraged during that period. Included in these efforts were measures to expand the nontraditional agro-export sector, based partly on the declining terms of trade for traditional developing-country export crops such as coffee, tea, cocoa, and cotton. Africa's proximity to the EU and Middle East, along with strong air freight transportation linkages from African capitals to cities in the EU, combined with Africa's comparative advantages of climate and low wages, created strong potential for increased export earnings in this sector (World Bank 2005).

The Potential for High-Value Food Products

Although international trade in staple crops was growing only at 2 percent a year, trade in high-value agricultural products was growing at 7 percent per year in the early 2000s (World Bank 2005). These nontraditional exports include seafood, processed food, cut flowers, and fresh fruits and vegetables (Mannon 2005). Defined more broadly to include meat products such as poultry, pork, and fish, as well as fruits and vegetables, production of high-value food products (HVFPs) in the developing world is growing at 5–8 percent a year, with developing-country consumption of these products increasing at 3 percent a year (Delgado et al. 2001). This case study will focus exclusively on fresh fruits and vegetable exports, which are characterized by intended consumption as fresh products, are highly perishable, and possess a high value-to-volume ratio (World Bank 2005).

The expansion of the FFV sector promised increased farm income through access to international markets and added nonfarm wage options in rural areas, as well as rural economic diversification. A few SSA countries, including Côte d'Ivoire, Kenya, South Africa, Uganda, and Zimbabwe, have experienced sustained growth and expansion in export earnings from nontraditional agricultural exports (World Bank 2005). In these countries, the FFV export sector grew very rapidly in the 1980s and 1990s, with smallholder involvement not increasing substantially until the mid- to late 1980s in some countries (Kenya) (Dolan and Humphrey 2000) and not until the early 1990s in other countries (Zimbabwe) (Masakure and Henson 2005).

Market Size and Growth Potential

The EU export market for FFVs is large enough to have made a significant contribution to the gross national product (GNP) of several African countries, but it is quite small compared with total EU FFV consumption and likely saturated after two decades of rapid growth and consolidation. Most of the FFVs consumed in Europe are produced there or in non-EU Mediterranean countries, and unless the economies of those countries move away from agriculture, there are not likely to be significant new opportunities for African producers to enter this market.

Compared with the 50 million metric tons of vegetables produced in the EU each year, only 1 million tons are imported (and the same amount exported). Of this amount imported from outside the EU, 43 percent comes from Africa, 37 percent from Asia and Latin America and the Caribbean, and 20 percent from non–EU Europe. Of the 430,000 metric tons (43 percent) coming from Africa, 262,000 tons come from Morocco alone, followed by Egypt (58,000 tons), Kenya (46,000 tons), South Africa (18,000 tons), and other countries (42,000 tons). Fruit imports represent a significantly greater portion of EU consumption, with SSA accounting for a far larger percentage of these imports than other regions of the world. Of the 7.5 million tons imported, 1.7 million come from SSA, with South Africa (900,000 tons), Morocco (266,000 tons), Côte d'Ivoire (370,000 tons), and Cameroon (200,000 tons) leading the pack. Thus, although Africa accounts for only a very small portion of the EU horticultural market (2 percent overall for vegetables and 24 percent for fruit), this market still represents a significant trade opportunity for African countries (World Bank 2005).

The Kenyan Horticulture Industry

The importance of agriculture to the Kenyan economy cannot be overstated. Seventy-five percent of the total population is involved with farming, and 67 percent of the population lives in rural areas. The horticultural sector has its roots in World War II, when Kenyan farmers grew significant amounts of FFVs and other agricultural products for the Allied troops stationed in East Africa. In later decades coffee and tea became dominant export crops, until the growth of tourism and the decline

of global coffee prices diminished their importance (Seo 2006).

Between 1963 and 1991, horticulture exports from Kenya rose by 12 times in tonnage and 40 times in value (McCulloch and Ota 2002). Between 1991 and 2003, Kenya's fresh vegetable exports increased from US$23 million to US$40 million (Jaffee and Henson 2004). By 1995 fresh produce exports were the third-largest source of foreign exchange earnings for Kenya (Mannon 2005). Although FFVs are still the fastest-growing agricultural subsector in Kenya today, they are now the fifth-largest export earner, accounting for 13 percent of gross domestic product (GDP) in 2003 (Lenne et al. 2005). Kenya is the largest exporter of vegetables to the EU (Dolan and Humphrey 2004).

The growth of the industry was fueled by a small number of Kenyan Asians who had horticultural production and marketing expertise and contacts with Asian ethnic markets in the EU. This expertise, combined with Kenya's agroclimatic zones and favorable climate for year-round production, led to the rapid growth of the industry. Vegetables exported from Kenya include French (green) beans, runner beans, snow peas, snap peas, okra, bitter gourd, and chilies (Seo 2006).

Large exporters with sizable financial resources entered the market in the 1980s, along with a significant number of small entrepreneurs and farmers. By the early 1990s small farmer participation in the industry had peaked and then faced a steady decline as production was consolidated among exporter and commercial farms (McCulloch and Ota 2002). Although the FFV processing sector has not grown as much as the FFV export sector, additional value has been added to the sector by increased processing of fresh produce, including cutting, washing, and packaging of FFV export products. Indeed, the Kenyan industry has been able to exploit its cheap labor and ability to add value to FFV products in order to remain competitive against other exporting countries with much lower air-freight costs (Jaffee and Henson 2004).

Despite its success, the Kenyan FFV industry as a whole faces barriers to continued participation in the EU and other export markets, and these barriers affect constraints to small farms seeking access to this sector. On the industry level, competitive challenges include transport costs and product perishability issues, increasing quality standards from EU buyers, and severe price pressures from competitors in other countries. Additional barriers to small farm participation include lack of access to credit, irrigation, seed stock for desired varieties, and market information on prices and quality requirements; high transaction costs for exporters sourcing from many producers; and EU food and phytosanitary standards. Although many of these constraints and challenges have been present for decades, the great increase in public awareness of and concern about food safety has recently led to ever more stringent standards for imported food products (Jaffee and Henson 2004).

Policy Issues

Value Chain Consolidation

As supermarkets started to bypass the wholesale market and work directly with exporters in the early to mid-1990s, they shifted quality control and monitoring down the chain to exporters while increasing requirements for packaging, processing, and traceability (Delgado et al. 2001). "The basic actors remained the same—African growers, African-based exporters, UK importers, and the UK supermarkets—but the number of actors, the distribution of functions between them, and the relations between them changed" (Dolan and Humphrey 2000, 157). Meeting these demands required that exporters invest heavily in drip irrigation, cold storage, and packing sheds, leading to the exclusion of many small and medium exporters, some of which started to grow produce for the larger exporters. By 1999, 75 percent of all exports from Kenya were controlled by several firms (Dolan and Humphrey 2004).

Supermarket Competitive Strategies

The consolidation along the value chain was driven by many factors but principally by changing supermarket strategies concerning product differentiation, increasing consumer concern about food safety and labor standards, and increased EU quality control standards (Dolan and Humphrey 2000). Although consumption has stabilized in relation to volume, owing to market saturation by the early 2000s, the value of food consumed continued to increase as additional improvements were made to processing and packaging, including prepackaged and ready-to-cook products and increased year-round consumption of typically seasonal products (World Bank 2005). Sales of ready-to-eat, prewashed salads, for example, increased by

34 percent in value between 1994 and 1996 alone. Although price is still a factor in this sector, the power has shifted from activities that lower costs to those that add value in the chain (Dolan and Humphrey 2004).

FFVs have long been a highly profitable and competitive segment of supermarket offerings, and they have become an even more important competitive tool among supermarket chains, to the extent that FFVs became a "destination category" for which consumers will switch stores. The competitive strategies in this more recent supermarket-driven value chain include quality, consistency, variety, processing (cut, chopped, or washed), product combinations, packaging (often at the farm level), reliability (to meet the needs of just-in-time supermarket warehouse operations), and price (which became important only in the late 1990s after market shares reached the saturation point) (Dolan and Humphrey 2000).

Tariff Trade Barriers to FFV Imports to the EU

The EU has imposed tariff-based trade barriers to importing FFVs, designed mainly to protect domestic temperate fruit and vegetable producers during the growing season. They are far less restrictive for tropical fruits and vegetables. Recently, a number of EU countries have taken additional measures to promote domestic horticultural industries by increasing tariffs, adding new tariff quotas, and occasionally introducing outright bans on FFV imports. EU tariffs are low (often under 8 percent) or seasonal on temperate and tropical fruit but more significant on vegetables (9–13 percent) (Hallam et al. 2004).

Although these tariff rates are significant on paper, the EU's General System of Preferences (GSP) and Everything But Arms (EBA) initiatives provide relief from these tariff rates. The seasonal nature of many tariffs, combined with the extension of tariff concessions, allows most developing countries to export FFVs while paying low or no duties on most products. The maze of nontariff sanitary and phytosanitary (SPS) restrictions imposed by importing countries and the private standards imposed by global supermarket food retailers may pose a more significant challenge to FFV exports to the EU (Hallam et al. 2004).

Changing Food Safety Standards

Increased demand for nontraditional and year-round FFVs was driven by heightened consumer concern over healthy eating, related to both healthy foods and food sanitation and quality. In 1990 the UK passed a Food Safety Act requiring that retailers be accountable for quality issues related to food manufacture, transportation, storage, and preparation. EU Directive 91/414/EEC stipulated that EU member countries must monitor pesticide residues on fresh produce. Globally, between 1995 and 2000, approximately 270 SPS restrictions were imposed on imported FFV products (Hallam et al. 2004). These increasingly complex safety standards created challenges for existing suppliers while raising the bar for new entrants at the country, exporter, and farm level (Dolan and Humphrey 2000).

Over and above the governmental standards imposed by the EU, private sector importers are imposing additional standards both to protect their safety reputation and to differentiate themselves from competitors. More recently, EUREPGAP standards for fruits and vegetables have represented an attempt to combine a plethora of private sector standards, although buyers impose many requirements informally through individual supply chains (Jaffee and Henson 2004). In addition, supermarkets developed a perception that smallholders could not meet production process controls such as safe handling and pesticide regulations, and exporters became concerned about the cost of monitoring a large number of smallholders for compliance with increasingly strict regulations (Dolan and Humphrey 2000).

Although tougher standards can be viewed as catalysts for strengthening and improving the competitiveness of developing-country agricultural supply chains, they are also viewed as nontariff trade barriers to FFV imports. During the Uruguay Round of multilateral trade negotiations, exporters voiced this concern, leading to the adoption of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) to provide rules for creating SPS measures while minimizing their trade-distorting effects (Jaffee and Henson 2004).

Exclusion of Small Farms

As the supermarket industry started working more closely with fewer exporters, they also turned away from smallholders and started working with fewer,

larger commercial farms, significantly changing the structure and governance of the export sector. Increased demands from supermarket chains for supply consistency, quality certifications, and product traceability made it increasingly difficult for smallholders to participate in the horticultural export market (World Bank 2005). Although the growth of this sector did create many direct sale opportunities for smallholders in the late 1980s and early 1990s in countries such as Kenya and Zimbabwe, the market share of smallholders and small export firms declined in the 1990s as the industry became dominated by fewer and larger supermarket chains, exporters, and farms (Dolan and Humphrey 2004). In 1992, for example, 75 percent of fruit and vegetables were grown by smallholders, but by 1998 the four largest exporters sourced only 18 percent of their product from smallholders (Dolan and Humphrey 2000).

Competitive Advantages and Disadvantages of the Small-Farm Sector

Small farms maintain a distinct comparative advantage over larger farm operations in the production of certain seasonal and labor-intensive crops. Benefits to exporters from buying from smallholders include low investment requirements, reduced market risks from growing produce themselves, and cost-effectiveness due to the low labor costs of engaging small farmers in the production of delicate or labor-intensive crops (Lenne et al. 2005). Larger commercial farms utilizing small farms in outgrower schemes have the ability to quickly expand or reduce production based on market demand without needing to acquire additional land.

Small farms, however, face significant constraints as well. In the face of intense cost competition, buyers incur significant transportation-related transaction costs in sourcing products from a large number of small farmers. In addition to traditional constraints such as limited access to capital, technology, and inputs, small farmers do not have access to information about market requirements for entry into high-value markets, such as production practices and handling and quality standards. One study identified several specific constraints among farmers producing kale for the Kenyan market (either at a higher price to supermarkets or in local spot markets). These constraints included (1) a lack of credit to purchase fertilizer and make capital investments in drip-irrigation systems mandated for supermarket sales, (2) the high cost of transportation to supermarkets, (3) cash flow constraints from infrequent payment by supermarkets (often monthly), and (4) lack of marketing experience or even aversion to marketing activities (Neven et al. 2006).

The risks to small farmers entering a high-value FFV market are also substantial. Just as buyers have no means of enforcing written or verbal contracts with farmers, small farmers have no recourse to force buyers to honor their agreements to purchase a farmer's output. There are also production risks with many FFV crops, such as snow peas and snap beans, which are not easy to grow and do not have a significant domestic market. The high quality standards of the export industry means that a large percentage of the crop could be rejected for export, leaving farmers with an unmarketable crop that, if not consumed locally, would often be fed to animals (Mannon 2005). In addition, not all smallholders participating in this market have the same level of support from exporters or lead firms. Farmers who are responsible for transporting produce to the processor or exporter and who also suffer from poor roads or unreliable transport are unable to maintain the quality required for the supermarket export chains (Dolan and Humphrey 2004).

Changes in Traditional Horticulture Markets

A recent World Bank study suggested that traditional spot market structures are in fact obsolete and of no utility for producers and exporters wanting to participate in the export market. This 2005 study suggested that spot markets are "excuse" markets, where producers are forced to sell when faced with lack of market information, high quality standards, and forward contacts in the supply chain. Middlemen-controlled markets are nontransparent and opportunistic and create substantial chain bias that drains margins and promotes uncontrolled distribution. As more producers are linked with exporters through direct sourcing (and contracting) from importers and transnational supermarket buyers, the spot market controlled by middlemen will diminish and become much smaller (World Bank 2005).

Despite the large size of the domestic horticultural sector in Kenya, it is by all measures a less productive, less efficient sector than the export horticulture industry. The domestic industry suffers from significant technical constraints, including underuse of high-quality improved seed,

poor adoption of improved production practices, and fragmented markets. Owing to transportation challenges and the unwillingness or inability to organize into marketing cooperatives, many farmers sell their FFVs at the farm gate at whatever price they are offered by middlemen—often at break-even prices (Neven et al. 2006). Even in the peri-urban areas near Nairobi, these markets are characterized by low prices during peak season, poor quality, high-cost transport, poor market information, and poor organization: "it is a highly inefficient system in striking contrast to the efficient, dynamic, and internationally competitive export-marketing system" (Lenne 2005, 230).

Off-Farm and Farm Employment

The growth of the horticultural export sector has created hundreds of thousands of jobs for semi-skilled and unskilled Kenyans, often young females. Despite the concerns over gender discrimination in this sector, some studies have shown that wages and benefits for those employed in this sector are better than those involved in similar tasks outside the sector (McCulloch and Ota 2002). Another study in the Senegal FFV export industry showed that participation in the sector has strong, positive effects on poor rural households and that the benefits are greatest for those involved as farm labor, not as primary producers (Maertens et al. 2007).

In a study involving more than 250 households in urban and rural Kenya, McCulloch and Ota found that households involved in the export horticulture sector in any way are better off than those not involved with the sector, especially in rural areas. The rural and urban poor are involved in this sector through farm-based FFV production, as labor on other farms, and in weighing, grading, cutting, and packing activities. The study found that small farms engaged in export horticultural production were better off than those working as farm or processing labor, who were in turn better off than rural farms not involved with the sector (McCulloch and Ota 2002). Nonetheless, the study was not able to determine if participation in the sector was the cause of relatively high incomes among "horticultural farms" or if these farmers were able to participate in the industry because of their higher incomes before participation.

Despite the documented benefits of participation in the export FFV sector for rural and urban poverty, there are significant labor concerns associated with the temporary, seasonal, casual, and female characteristics of the work force. Women make up the majority of seasonal workers and face long work hours under difficult and hazardous conditions, primarily related to contact with pesticides. The female workforce also faces significant incidence of sexual harassment and discrimination if pregnant. Efforts are being made to develop and enforce workplace codes and standards, such as the Kenyan Horticultural Ethical Business Initiative (HEBI), although a broad range of actions including national legislation, improved international labor standards, and a multistakeholder approach will be necessary to make significant progress in farm labor conditions (Smith et al. 2004).

Benefits and Drawbacks of Contract Farming

One strategy that can increase or sustain smallholder involvement in the FFV sector is expanded use of contract farming schemes. "For such [smallholder] producers to remain engaged in growing high-value export markets, they must be able to contract forward with the main outlets for their produce, and must be organized in ways that reduce the risks that either party will be unable to complete the terms of their contract" (Delgado et al. 2001, 2). The main benefit and motivation for smallholder farmers to participate in contract farming is increased household income, which is sometimes three to five times greater than before the horticultural export market was available to these smallholders (Lenne et al. 2005). The second most important reason is price risk management (Masakure and Henson 2005).

In detailed interviews with several hundred Zimbabwean contract farmers, Masakure found that the most important motivators for smallholders to enter into contract production with exporters were (1) to earn extra income, (2) to avoid poor transport infrastructure, (3) to reach a guaranteed market for crops, (4) to obtain a reliable source of inputs and credit, (5) to acquire knowledge for new or current crops, and (6) to earn a guaranteed minimum price. Farmers in this study even viewed their involvement with contract farming for the export sector as a means to acquire skills to improve production of crops for local markets. Thus, contract farming provides small farms with a package of benefits that cannot be matched by the public sector and traditional domestic markets in many African countries.

In many contract farming schemes, the buyer arranges for the farmers' access to credit, inputs, technical assistance, and the desired seed varieties. Typically, the lead firm (buyer) provides seed, fertilizer, and agrochemicals to farmers, and the costs of these items are deducted when the crop is sold to the lead firm (Jaffee 1994). Given these motivations for engaging in contract farming for the export market, this practice can be viewed as a means for farmers to avoid weak, even failed, local market institutions (Masakure and Henson 2005).

One common problem with contract farming occurred when farmers broke their contracts with buyers by selling produce on the spot market (or to other exporters) for higher prices. While somewhat understandable from the farmer's perspective, the losses and supply chain difficulties exporters encountered from this practice was one of the factors that led to reduced dependency on smallholder contract farmers to provide produce for the export market. In addition, exporters sometimes actively and aggressively encouraged this behavior when they had difficulty meeting their contracted export volume quotas, often sending trucks through rural areas to "poach" produce from farmers contracted to competing exporters (Mannon 2005).

Domestic Supermarket Industry Opportunities

In a review of the horticultural export market, it is also important to understand the size and importance of domestic and regional markets, since almost all small farms sell to both markets. One study of Kenya's vegetable export system suggested that it could be a role model for the domestic vegetable production system in that country, demonstrating the benefits of improved, disease-resistant seed varieties, better delivery systems for agricultural inputs and technical assistance, and more effective transportation and marketing systems (Lenne et al. 2005).

Despite the huge growth and success of the export vegetable sector in Kenya, only 5–10 percent of the total volume of FFV produced is exported, and the rest is consumed domestically. As of 2001, 70–80 percent of marketable produce was grown by smallholders. Between 1997and 2001 the value of vegetables sold in local markets was more than four times greater than that exported, and local markets generated more absolute value than export markets. By 1995 the growing, indigenous supermarket industry in Kenya itself was already purchasing half the volume of exported FFVs (Neven and Reardon 2004), making this sector a significant new market opportunity for farmers producing high-value FFV products. Many of the same barriers that prevent small farms from participating in the export FFV sector, however, are already limiting or reducing their access to the high-value Kenyan supermarket sector.

Stakeholders

EU Supermarkets

EU supermarkets are the ultimate destination for the majority of Kenyan FFV exports to that region. In the 1970s and early 1980s they obtained FFV produce from Kenya through a network of exporters and wholesale market importers. When EU supermarket chains started entering the FFV market more directly in the 1980s, without going through exporters or importers, they did so without being able to specify product, process, or logistical parameters along the supply chain and with little control over quality or the timing of shipments (World Bank 2005).

Rather than continue to deal with producers at arm's length in the undifferentiated, wholesale spot market, during the 1990s multinational supermarket and food-processing companies developed tighter control over and stronger linkages with firms in their supply chains, in what was becoming a buyer-driven global value chain (Dolan and Humphrey 2004). Supermarkets became the new legislative power in the sector; supermarket standards dictated what FFVs were produced and how, and these standards overruled and often exceeded increasingly restrictive EU legislation. "This new power also provided opportunities for those having the capacity to respond to supermarket chains in their quest for reliable sources, chain standardization, lowest trade margin, highest retail margin, maximum reliability, and [increased] supply chain management" (World Bank 2005, xii).

Exporters and Importers

In the 1960s and 1970s the majority of FFVs sold in the EU came through wholesale importers who acquired produce from exporters procuring from the undifferentiated spot market. With low barriers to entry for both producers and exporters, many small and medium-sized exporters and farmers

entered the market. Indeed, by 1986, 15,000 small farms engaged in production for this market in Kenya alone. This trade grew until Kenya accounted for 30 percent of EU vegetable imports by 1990 (Dolan and Humphrey 2000).

Until the 1990s the FFV export community consisted of two distinct groups: (1) a small exclusive group characterized by high quality, consistency, and traceability, and (2) a large spot market characterized by "a relatively unsegmented structure, fluctuating supply and prices, unidentified source/origins, and vague quality perception" (World Bank 2005, 55). Increased volume, delivery, and quality standards that came into the industry through the increased involvement of EU supermarket chains, combined with the problems caused by poaching activity on the production level, led exporters to move toward using fewer, larger farmers in their supply chains. Still, in order to reduce risk and ensure a consistent, high-quality supply of produce, exporters and importers used a variety of sources for their products. These other options included acquiring land for plantation-style production and purchasing produce on the spot market or through outgrower schemes (Mannon 2005).

Commercial Kenyan Farms

Commercial farms in Kenya produce a significant and growing percentage of FFVs for export to EU supermarkets and for the high-value domestic supermarket sector, with the four largest exporters sourcing 82 percent of their product from their own farms or from large commercial farms by 1998 (Dolan and Humphrey 2000). Many enterprises play dual roles as farmers and exporters. They often use small farms in outgrower schemes that allow them to exploit the small farm advantage in certain labor-intensive crops, to maintain flexibility in producing products with fluctuating or seasonal demand, and to gain access to farmland in situations where it is politically inexpedient to purchase new land. This class of farmers produces for exporters or EU supermarket-importers using extensive and highly specific contracts. Alternatively, these farmers play the role of long-term "preferred providers" for export firms or supermarket buyers. They have often invested significant resources in irrigation and packaging infrastructure, production technologies, and EUREPGAP or organic certification regimes.

Poor Rural Farmers

Approximately half of Kenyans live below the poverty line, according to recommendations on daily caloric intake from the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). Rural poverty is only slightly higher than urban poverty rates (McCulloch and Ota 2002). Small farmers in Kenya face severe economic and natural resource pressures and concerns. In addition, they have limited access to technology, capital, packaging and transportation infrastructure, and information on market prices and quality requirements (Seo 2006). These farmers are not able to increase their income from the production and sale of either traditional food staples like maize and legumes or traditional cash crops such as tea, cotton, and coffee. They seek on- or off-farm economic activities that will increase their income to more than US$2 a day and improve their household food stability situation.

Small to moderate-size farms that supply produce to lead firms (exporters) usually do not have a written contract, because those are largely unenforceable in rural areas of developing countries. Instead, the lead firm usually provides inputs as in-kind credit, and the cost of these inputs is subtracted from the value of the delivered produce. A minimum price is stipulated before planting, although in some cases the lead firm provides a premium to the producer when the export market price increases above the agreed-upon price, to prevent poaching or side-selling of contracted produce (Masakure and Henson 2005).

The Kenyan Government and Government-Supported Agencies

The Kenyan government has been little involved in setting regulations and standards to govern the FFV industry and is generally not credited with making significant contributions to the growth of the sector. In fact, many authors have attributed the commercial success of the sector to the relative absence of government intervention. Although the government does issue export licenses, it does not impose significant export taxes or attempt to control marketing and distribution of FFVs (McCulloch and Ota 2002).

The government has, however, been involved in creating various research and extension agencies to support and facilitate the growth of the domestic horticulture industry and is likely to seek greater involvement in the continued growth of the export

FFV and domestic supermarket industries. The Kenyan Agriculture Research Institute (KARI) was developed in 1979 as a semi-autonomous government institute to research crop and livestock production and marketing systems. The Horticultural Crops Development Authority (HCDA) was developed in 1967 as a government parastatal intended to promote and strengthen the horticulture industry by providing training, consulting, licensing, and market promotion services (Seo 2006). A private sector entity, the Fresh Produce Exporters Association (FPEAK), was established in 1975 as a membership organization with the mission of enhancing the competitiveness of the horticultural export industry (Seo 2006).

The Donor and Development Community

The donor community operating in Kenya does not speak with a unified voice on issues of trade and poverty alleviation and is motivated by many different issue and policy goals. Bilateral donor agencies such as the U.K. Department for International Development (DFID) and U.S. Agency for International Development (USAID), and the contractors and Western NGOs that implement their projects on the ground in Kenya, are directly influenced by their governments' foreign policy goals and by political relations with the Kenyan government. Their goals are philosophically supported by neoclassical economic thinking and are largely consistent with the liberalization and structural adjustment policies advocated by the World Bank and International Monetary Fund (IMF) in the 1980s and 1990s.

Therefore, donor projects that relate to or could impact the FFV sector in Kenya are likely to promote export agriculture, free markets, and few restrictions on multinational corporations or foreign direct investment (FDI) practices. At the same time, these agencies and organizations are committed to promoting broad-based poverty alleviation in Kenya. Those NGOs that receive both government and significant private funds often operate with more autonomy from foreign policy concerns (including Oxfam, Catholic Relief Services, CARE, World Vision, and Save the Children). They are more likely to consider poverty alleviation, child survival, and economic justice issues first and more directly than the needs of the private sector and overall economic growth.

Policy Options

It is well documented that the growth and current strength of the high-value horticulture market in Kenya, both for export crops and for high-value domestic markets (supermarkets), evolved with very little government intervention. Continuing along current trends, the sector is likely to grow but with continued consolidation of supply chains and continued marginalization and exclusion of small farms. As it currently stands, there are few incentives for this private sector–led industry to reverse trends in supply chain consolidation and take measures to increase participation of small farms.

The NGO and donor community has and will continue to make some efforts to facilitate participation of small farmers through donor-funded projects and social advocacy. Given the relatively low level of involvement by the Kenyan government to date, however, there may still be opportunities for new policies and a greater governmental role in an effort to increase participation of small farmers in the high-value FFV sector. The policy options mentioned here are intended to be implemented by the Kenyan government in the interest of broader dispersal of profits in this sector and greater small-farm participation.

Expand Export Trade

The Kenyan government could take a more proactive role with domestic and EU players in the sector to expand market penetration into EU supermarkets and food-processing industries and to gain entry to other FFV export markets in Eastern Europe, the Middle East, and even the United States. Expanded market participation could occur by focusing on untapped EU countries and importing firms and by identifying additional FFV products to export to existing clients. Government-to-government advocacy for further reduction of seasonal EU tariffs on FFVs imported from developing countries could lead to additional competitive benefits. The development of new export markets outside the EU might involve sending trade delegations to new countries to promote Kenya as a source of FFV products and providing tax incentives to encourage the private sector to explore and develop new markets.

Develop Local and Regional High-Value Horticulture Markets

The catalyst for development of this sector is the growing Kenyan and East African supermarket industry. Between 1994 and 2003, supermarket floor space in Kenya grew from 475,000 square feet to 2 million square feet in more than 225 stores (Neven and Reardon 2004). The time lag between new store openings and the addition of FFV sections in these stores should ensure that small farms have growing opportunities to sell FFVs to these stores even without significant additional growth in store numbers.

This approach would involve an acknowledgement that the combination of high market entry requirements for the FFV export industry combined with the relative maturity and saturation of these export markets will make it difficult to significantly increase small-farm participation in this sector. Instead, the Kenyan government could work in partnership with local private supermarkets, agro-processors, and donor agencies to forge public-private partnerships that would increase small farm participation in a domestic market that has lower entry requirements and greater potential for increased growth. This option may in the medium run actually facilitate significant participation of small farmers in the export market as well, as small farmers and farmer associations acquire the production, transportation, and business skills to compete in both high-value FFV sectors.

Promote Increased Employment of Rural People in the Export Sector

The export sector is out of reach for most small farms, but nonfarm participation in the export sector offers significant benefits for rural income and poverty alleviation. This option would involve regulatory actions and industry consensus-building efforts to make labor conditions in this sector more humane and less gender-discriminatory and to maximize the ability of rural households to maintain their farms at the same time they work as laborers on others' farms.

Increase Small-Farm Participation by Promoting Small-Farm Marketing Associations

This option would entail addressing an area in which development assistance over decades has been challenged to produce significant results—organizing African farmers into production and marketing cooperatives. The government would need to provide training and technical assistance in forming and developing cooperatives to those farm and rural entities that emerge as motivated and entrepreneurial leaders in Kenya's FFV-producing regions. On the industry side, the government could develop policy incentives for the FFV buyers themselves to more proactively seek small farms and small-farm associations from which to buy FFV products. Public-private partnerships between government agencies in South Africa and national supermarket chains have resulted in significant use of small farms in the Fort Hare region. USAID-funded market access projects in Kenya have significantly increased small to medium-sized farm participation in the tree fruit value chain for domestic and export markets (Snodgrass and Sebstad 2005).

Improve Governance and Industry Transparency

This option—the least invasive or expensive of the five options—accepts that free-market forces have shaped Kenya's horticultural industry and that allowing private-sector actors to pursue efficiencies is the best way to keep the sector competitive and profitable and ultimately to benefit the country overall. It requires that the government take policy actions not to strengthen the sector, but to strengthen the business environment, including sound macroeconomic policy and market structures within Kenya. This policy does not assume or directly promote increased participation of small farmers, but rather creates a transparent and relatively level playing field for the industry actors to organize and compete to maximize efficiencies, which may or may not result in increased small-farm participation. Policies options include (1) reinforcing the business climate, (2) establishing a sound legal framework, (3) safeguarding consumer interests, (4) reducing transaction costs, and (5) managing risk (Ruben et al. 2006).

Assignment

Your assignment is to make recommendations to the Kenyan government on what policies should be pursued to enable the FFV export industry to make a greater contribution to the alleviation of rural poverty in Kenya.

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Chapter Six
Contract Farming in Costa Rica: A Case Study on Contracts in Pepper Farming (6-6)

by Fernando Sáenz-Segura, Marijke D'Haese, and Ruerd Ruben

Executive Summary

Contract farming is defined as an agreement, which may range from a simple verbal commitment to a written document, between a farmer and a firm, in which the farmer agrees to deliver fresh or partially processed products, and the firm commits itself to purchasing the produce under certain agreed price and non-price conditions. Contract farming is usually considered a substitute for poorly functioning or absent markets. The literature on contract farming presents two opposite views of the potential of this alternative market institution as a bridge for trading between smallholders and agroprocessing firms. Some researchers argue that contracts are an adequate mechanism for integrating smallholders into dynamic markets by overcoming the constraints of a failing market. Others warn about the downside of contracting.

We present the rationales for different types of contractual regimes between small-scale pepper producers and agroprocessing firms in the northern region of Costa Rica under two market configurations—namely, a competitive market and a local monopsony. Three types of contractual agreements (written contracts, verbal commitments, and no agreement) are found. The analysis is based on a survey of pepper producers using a semi-structured questionnaire to obtain data on production systems and marketing arrangements.

Pepper is an attractive diversification activity for smallholders because it is a labor-intensive crop, does not require complex technologies or machinery, requires detailed attention and frequent disease control through the cropping cycle, and can reach high, fairly stable yields per hectare. A major drawback is the high entry cost during the start-up phase, stemming from the need for initial investments in crop establishment and the long maturation time before the first harvest. Contracts may help overcome these constraints and permit market entry at a reduced level of uncertainty.

A farmer's level and sources of income have a clear effect on his or her contract choice and bargaining power. Income diversification enables farmers to increase their asset specificity in pepper crops,[1] even without the insurance provided by contracts. Therefore, pepper companies prefer to offer contracts to less-endowed farmers who have some farming experience but limited income diversification. These farmers are likely to engage in contract farming owing to their limited bargaining power. Even though the enterprise operating in the monopsonistic market also maintains high asset specificity, it is able to buy from some farmers without any prior agreement, since the latter possess limited bargaining options for valuing their asset-specific investments.

Farmers with contracts definitely invest more inputs and time in soil maintenance activities on their pepper plots. Resource-providing contracts in the competitive market have a stronger effect on farmers' investments than simple market specification contracts in the monopsonistic market. This finding confirms the literature regarding the importance of resource-providing contracts and vertical integration for sustainable agricultural intensification (Kuyvenhoven and Ruben 2002). Budget-constrained farmers that intend to tailor their investment decisions in line with the designed technological package may substitute for the default level of fertilizer use with additional labor investments in soil maintenance activities.

Your assignment is to recommend a government policy to assure an acceptable level of competition

[1] Asset specificity means high specialization of investments for a near-unique commercial purpose (Key and Runsten 1999; Hobbs 1996; Williamson 1991). It has been argued that a higher level of asset specificity reduces the bargaining power of one party with respect to another party (Kusterer 1982; Glover 1987; Key and Runsten 1999).

and to facilitate increasing incomes and reduced risks for low-income pepper farmers in Costa Rica.

Background

Contract farming is frequently mentioned as a substitute for poorly functioning or absent markets. Contract farming is an agreement between a farm and a firm—either a simple verbal commitment or one based on written documents—through which the farmer produces a fresh or partially processed product and the firm is committed to buying it under certain stipulated conditions (Roy 1972; Glover and Kusterer 1990; Grosh 1994). Contract farming serves as an economic institution operating between spot markets and vertical integration (Grosh 1994; Key and Runsten 1999) and arises as a response to selective or simultaneous market failures for credit, insurance, information, factors of production, or commodities (Key and Runsten 1999). Contracts are one of the various ways of coordinating economic activities between a farmer and a processing firm, enforcing a certain type of supply chain management for a given commodity (Hobbs 1996).

The effectiveness of contract farming can be considered from the perspective of the farmer or the trading firm. Firms can use a variety of institutional arrangements to obtain raw products for processing or marketing, relying on different degrees of vertical coordination and related governance structures. One extreme is the spot market, where the transaction takes place among several actors and the price is set during the transaction. The firm does not participate at all in the production process, and all other aspects of the transaction (that is, quality, quantity, and timing) are nonnegotiable. In this situation there is no real supply chain management (Hobbs 1996). At the other extreme, with full vertical integration, there is a continuous flow of products and information during different stages of a supply chain and transactions follow a corporate scheme rather a negotiating-parties scheme. Here, the firm has complete control over production.

Contract farming takes an intermediate position, allowing the firm to participate and thus exert different levels of control over the production process without formally owning or operating the farms. It is mainly a way to distribute activities in the supply chain and the corresponding risk between the firm and farmers. The farmer bears most of the production risk, and the firm, most of the processing and marketing risk. The exact allocation of risk depends on the specifications of the contract. The firm chooses an optimum contract considering transaction costs and profit (Key and Runsten 1999), depending on the prevailing market uncertainty related to the transaction, the degree of asset specificity (including its bargaining position), the frequency of the transactions (Hobbs 1996), and the monitoring costs surrounding the production process (Singh 2002).

Contracts have the potential to provide mechanisms for incorporating small and low-income farmers into the market economy (Glover 1984; Key and Runsten 1999). Several authors argue, however, that contracts could also lead to market segmentation and exclusion, thus generating more negative effects on farmers than positive ones (Glover and Kusterer 1990; Grosh 1994; Little and Watts 1994; Porter and Phillips-Howard 1995, 1997; Torres 1997; Siddiqui 1998).

In general, contracts can be classified into three categories that are not mutually exclusive: (1) market specification contracts, (2) production management contracts, and (3) resource-providing contracts (Minot 1986; Williamson 1991; Hobbs 1996; Key and Runsten 1999; Singh 2002). Market specification or procurement contracts are simple pre harvest agreements in which the firm commits to providing a market outlet for the farmer (Hobbs 1996). Such contracts usually stipulate conditions regarding price, quantity, quality, and timing (Singh 2002). The farmer gets reduced market and price uncertainty as he or she transfers the produce to the firm without losing control of the production process (Hobbs 1996). Production management contracts require the farmer to adopt specific growing practices, input regimes, and post harvest management practices under the technical supervision of the firm. Resource-providing contracts require the firm not only to provide a market outlet for the farmer's production, but also to deliver specialized input packages and supervision to the production process. Hence, the firm obtains full control of the farm and the farmer almost becomes an employee. Resource-providing contracts are the closest situation to full vertical integration (Hobbs 1996; Key and Runsten 1999; Singh 2002). Beyond these three main categories of contract, many other forms are possible.

The selection of any of these contractual forms varies according to the type of commodity, the

characteristics of the agents, and the market conditions for a given period of time (Hill and Ingersent 1982; Key and Runsten 1999). Although the firm decides on its organizational strategy, the farmers, in turn, can choose to engage in a contract or to sell the harvest on another market.

Delivery contracts between smallholders and agroindustrial processing firms are usually considered a device for reducing risk and a strategy for guaranteeing continuous supply (Glover 1987; Grosh 1994). For the start-up of nontraditional agro-export production, contracts provide farmers with security and facilitate necessary investments. In practice, however, a wide variety of contractual agreements coexist, and local farmers may be able to negotiate different delivery conditions that serve their particular interest (Key and Runsten 1999). Contractual arrangements can differ in the conditions of price and payment, the services provided, quality and production requirements, and input supply provisions (Grosh 1994). The aim of this case study is to illustrate that different contract forms may coexist. We present and analyze the contracts that pepper farmers engage in with pepper processors in Costa Rica.

Stakeholders

Pepper Production in Costa Rica

Pepper (*Piper nigrum* L.) production started in Costa Rica in the 1970s as an experimental crop for large plantations. The pioneer was the North American entrepreneur Charles Hunter, who started a plantation of about 15 hectares (ha) and a small processing facility in the northern region of Sarapiquí. The importance of pepper increased, and the crop expanded rapidly in the lowlands of Costa Rica and covered a maximum area of 500 ha in 1990 (Rojas Zúñiga 1994).

From the mid-1980s onward, small farmers from Sarapiquí also started to cultivate peppers. Laborers from the Hunter's pepper plantation took some seedlings home and started cultivating them in their own plots, selling the harvest to Hunter's enterprise, which had promised to buy it (Vega, personal communication). In 1987 another North American entrepreneur, Walter Kinsing, started a new production and processing company: Pimienta y Especias de Centro América S.A (PIMECA S.A.) and entered the market with his own 65-hectare plantation (Cubillo, personal communication)[2]. By 1988 the Costa Rican land reform agency, the Institute for Agrarian Development (IDA), started a promotion campaign for pepper as a nontraditional crop for small and medium-scale producers (Rojas Zúñiga 1989). This activity received strong support from the Coalición Costarricense de Iniciativas de Desarrollo (CINDE)—a nongovernmental organization (NGO) funded by the U.S. Agency for International Development (USAID)—in line with the export promotion activities within the framework of the structural adjustment program and trade reform policies.

The major share of Costa Rican pepper production is currently located in farmers' settlements in the Huetar Norte region. The current cultivated area is around 74 *manzanas* (52 hectares), the average plot is 1.22 mz, and production has increased to 2,458 kilograms (kg) per year, most of which is processed and sold in the domestic market.

The marketing chain for pepper is relatively short and uniform. Farmers sell their harvest individually and directly to wholesaler-assemblers that process it to produce dried black or white pepper and take care of packing. Processors can sell on both the national and the international market. For the international market, pepper is packed in sealed bags of 50 kg and sold either to a broker or directly to a wholesaler. The broker sells pepper on the spice market, and wholesalers repack and distribute the pepper to retailers. In the national market, pepper is sold directly to food industries that repack the pepper for retailers or use it as an input in processed food. A small fraction of the processed pepper is directly distributed to retailers or restaurants.

Methodology of Study

This study builds on data collected from 50 producers (representing about 65 percent of all pepper producers). Because a list of pepper producers was not available, farmers were found through snowball sampling. More information on the production zones was available through the IDA and the National Geographic Survey Institute. Three processing companies to whom the farmers supplied their pepper crop were identified.

[2] Ing. Abdenago Cubillo and Ing. Carlos Vega are local experts who were interviewed in 2000.

The largest and most enterprise-oriented actor is Company A.[3] This company has been active in the pepper market for 12 years and owns the largest processing plant with an advanced technology level. The company specializes in the production of white pepper,[4] and most of the production is sold to an international food processor based in San José, Costa Rica. Company A does not grow pepper itself but is exclusively a processing company that obtains the raw produce from smallholders. Its relationship with the farmers was initially based on verbal agreements, but since 1998 the company has also offered written contracts.

The other agroprocessor, Company B, operates a smaller plant with simple technology and is predominantly a producer-processor; it owns a large plantation of about 110 ha of pepper at different stages of growth. In the year 2000, Company B started to buy pepper from small producers to smooth its supply and keep the plant running at maximum capacity. Plant diseases have forced the company to renovate most of its own plantation. Company B processes black pepper and prefers to sell in the international market, but currently the processed pepper is sold domestically because the company claims that with its current low output, transportation costs are too high to allow for profitable sales abroad.

Company C is a small private producer/processor in the northern zone, owned by a former small pepper producer, that used to sell the harvest to Company A. Company C decided to start doing its own processing, however, when Company A refused its harvest several times owing to quality considerations. It is a very simple, small-scale plant and produces only whole-grain black pepper for the domestic market. By the year 2000, Company C started buying regularly from other farmers. Although this firm claims to work without any type of agreement, some farmers stated that they do have an informal agreement, in which the processor promises to buy their harvest on a fixed day and the payment is made in cash at the moment of the transaction.

Table 1 summarizes the characteristics of the three companies. Part of the pepper sales take place without any prior arrangement, especially when processing firms face limited supply. The contractual arrangements include various obligations for the farmer regarding the use of specified seedlings, input applications, and frequency and place of delivery. Obligations for the buyer refer to the price paid for pepper, the payment system and the provision of technical assistance.

Most important differences between the three buyers are related to the types of guarantees used for enforcing delivery, the procedures for price determination, and whether instantaneous or delayed payments are preferred.

In addition to these three processors, there are also an unidentified number of other intermediaries that buy directly from the farmers, but only sporadically (for instance, once or twice a year). They act mainly as middlemen between farmers and food-processing companies making emergency purchases when facing problems with their regular supplies of pepper.

Contract Types According to Region

In terms of the farmers selling pepper, we distinguish a region where only Company A is active (where Company A has a monopsonic market) and a region where all three companies procure pepper from farmers. Table 2 gives an overview of the distribution of farmers over contracting arrangements. Five contractual conditions are identified, namely: (1) farmers with written contracts in a monopsony market; (2) farmers with verbal contracts in a monopsony market; (3) farmers delivering without any contract in a monopsony market; (4) farmers with verbal contracts in the competitive market; and (5) farmers delivering without any agreement in the competitive market.

The essential difference between the contracts provided by the companies refers to product and process specifications. Written and verbal contracts by Companies A and B are defined as resource-providing arrangements that include input delivery and technical assistance. These contracts closely resemble quasi-vertical integration based on long-term co-investment activities (Hobbs 1996). For Company B, resource provision is part of a strategy of backward integration aimed at supplementing raw material delivery to the processing plant. On the other hand, verbal agreements provided by Company C are strictly market-specification

[3] The names of the companies have been left out in order to respect the anonymity of the companies that provided information for the case study.

[4] The company can also produce small amounts of black pepper at the request of its main customers.

contracts that are limited to provisions regarding price, delivery time and quantity. The latter types of arrangements refrain from any involvement in the production process and are limited to simple product delivery specifications.

It is hardly possible to establish a preference ranking between agreements on the basis of the differences described. Selection of specific agreements mainly depends on the needs and preferences of particular farmers. Poorer and less-endowed farmers may prefer a written contract to a verbal commitment or no commitment at all. In terms of input and service provision, farmers will generally be better off with an agreement from Company B. On the other hand, when farmers prefer flexibility, rapid payments, and few restrictions, they will probably choose Company C.

Table 1: Main Characteristics of Processing Companies in the Study

Buyer/ Characteristics	Scale	Region of influence	Technology level	Years of experience	Years of relations with small farmers	Target market	Types of agreements with farmers
COMPANY A • Agroprocessor • Preferred supplier arrangements	Large	San Carlos, San Ramón, Sarapiquí	High	10	10	National and international	Written contracts, verbal agreements
COMPANY B • Agro-processor-producer • Vertical integration	Medium	Grecia	Middle	12	Buyer: 9 Agreements : 5	National and international	Verbal agreements
COMPANY C • Producer–small processor • Delivery dates	Small	Sarapiquí, Grecia	Low	Processor: 5 Producer: 10	2	National	Informal and verbal agreements
Intermediaries • Buying for Costa Rican or Nicaraguan processors	Very small	Guatuso, Chachagua	Low	1–2	1–2	National and international	None, buy only sporadically

Table 2: Sample Size for Each Contractual Condition

	Contracting arrangement			
Type of market/main buyer	Written contract	Verbal agreement	No agreement	Total
Monopsony market				
Company A	9	11	3	23
Competitive market				
Company A		7	3	10
Company B		9	1	10
Company C		4	3	7
Total	9	31	10	50

To identify what types of farmers typically engage in contractual delivery of pepper to local buyers, we compare the farm-household and production characteristics in each market segment in Table 3. Farmers with an agreement operating in the competitive market generally own smaller, less fertile farms on flatter land. More experienced and less educated farmers in this market segment prefer verbal agreements over no agreement. In addition, land is more intensively used, although their pepper production is lower than that of farmers with no agreements. Producers operating in the competitive market with verbal commitments own older pepper plantations but obtain a lower procurement price. Finally, these producers use more technical assistance than farmers with no agreements.

On the other hand, the monopsony market segment contains mostly younger farmers with smaller farms and more specialized farming systems. They operate more recently established plantations that are larger in size but have considerably lower productivity. Most farmers are affiliated with farmers' organizations in order to reinforce their bargaining position. Further analysis shows that farmers contracting with Company B depend the least on pepper production but achieve better yields, whereas farmers delivering to Company A are usually poorer and more engaged in off-farm activities, thus requiring additional technical assistance.

Comparing farm-household characteristics with different types of contracts reveals written contracts only among farmers in the monopsony region. Such contracts offer a guaranteed minimum price and assure a purchase commitment by the firm for a period of 15 years, which reduces the farmer's price and market risk. Young, better-educated producers who own small farms, have less farming experience, and have limited land endowment and investments in pepper usually prefer formal or written contracts. Moreover, farmers with contracts have lower incomes and rely more on other nonagricultural sources of income. Therefore, farmers relying on formal contracts are likely to have reduced risks during the initial establishment phase (two years without harvest). Producers engaged in pepper production under verbal agreements, on the other hand, are generally older, have less formal education, and have been farming for a considerably longer period of time. They operate more mature plantations and seek guaranteed market outlets. Finally, farmers without any contractual arrangement own the largest farms and the largest investment in new pepper plots. They achieve the highest pepper yields but prefer to remain independent in their marketing operations. Besides, they have a higher share of their income from other commercial crops and rely less on income from nonagricultural activities.

The comparison of market segments and contractual arrangements shows that especially less educated, poorer farmers with limited farming experience prefer a verbal contract. Since they own older plantations and are strongly dependent on pepper revenues, they have to rely on risk-minimizing marketing strategies (Magnusson and Ottoson 1996). On the other hand, larger farmers that maintain younger, high-yielding pepper plantations are more likely to rely on spot market exchange as part of their risk diversification strategy. Pepper prices are slightly higher in the competitive market, and farmers without a contract were even able to negotiate a more attractive price.

Policy Issues

Contracts as Insurance Devices

This analysis has revealed that younger and better-educated farmers with limited land endowments and investments in pepper prefer written contracts rather than verbal agreements. Farm households with nearly 40 percent of their income derived from nonagricultural activities follow a risk-management strategy to cope with liquidity constraints. Although this strategy might have negative effects on production efficiency, for low-income farmers it tends to be the preferred option for smoothing consumption (Key and Runsten 1999). Therefore, these households opt for the insurance provided by a written contract before engaging in the production of specialized nontraditional crops. Contracts offer insurance against price fluctuations and the uncertainties related to finding appropriate market outlets. Income-constrained farmers are willing to accept the conditions imposed by a written contract simply because they do not have enough sources of income to cope with market and price uncertainty, even when the price conditions stated in the contract are less favorable than those offered in the spot markets.

Table 3: Farm-Household Characteristics According to Type of Agreement

Variable	Monopsony market			Competitive market	
	Formal contract	Verbal agreement	No agreement	Verbal agreement	No agreement
Number of cases (N)	9	11	3	20	7
Farm characteristics					
Farm area (*manzana*; 1 mz = 0.7 ha)	12.30*	15.00	34.6*	27.2	73.10
Soil fertility (3 = high)	2.67	2.36	2.00	1.90*	2.14*
Drainage (1 = good)	.45	.36	.67	.25	.14
Soil erosion (1 = yes)	.56	.18	.33	.25	.29
Mountainous land (1 = yes)	.78*	.36*	.67	.70**	1.00**
Household characteristics					
Household size (number of persons)	4.70	4.50	5.00	4.50	3.40
Age of head of household (years)	39.70**	48.00**	37.00	50.60	47.90
Education level (secondary = 1)	.78***	.18***	.67	.45*	.57*
Farming experience (years)	17.20***	33.50***	20.30	32.90*	21.00*
Off-farm employment (1 = yes)	.67	.36	.33	.60	.43
Gross household income (US$/year)	4,231*	5,205	16,054*	6,752	4,344
Income from other nonagricultural activities (share of gross household income)	39.02**	32.50**	3.02**	24.02	41.52
Production system characteristics					
Share of arable farm land (%)	52.9	45.80	84.40	40.90***	9.40***
Experience in pepper production (years)	5.60	7.00	9.30	6.80	8.60
Area of pepper in production (mz)	.91	.79	.83	.64	.52
Area of pepper not in production (mz)	.27***	.67	1.87***	.47	.63
Age of plantation (years)	3.80	6.30*	3.0*	6.5*	4.6*
Degree of specialization (share of arable land under pepper)	29.20	36.00	25.40	31.00	24.10
Pepper yield (kg/ mz per year)	3.64	3.22	3.65	7.25	8.43
Output index[a]	.80	.61**	1.44**	1.07*	1.42*
Mean price of pepper sold (US$)	.90	.90	.90	.92***	.94***
% of income from commercial crops (share of gross household income)	21.00	17.50*	25.76*	13.50	8.04
% of income from cattle production (share of gross household income)	3.00	11.05	5.82	20.66	17.28
% of income from pepper (share of gross household income)	30.20	31.50	22.30	34.76	33.12
Institutional characteristics					
Use of technical assistance (1 = yes)	1.00	.91	1.00	.80**	.57**
Use of credit (1 = yes)	.56	.55	.67	.35	.14
Member of farmers' organization (1 = yes)	.67	.55	1.00	.30	.43

Note: T-test and ANOVA test of significant differences of means: *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

[a] The output index is calculated by considering the yield reached by the farmers compared with the attainable yield for the corresponding age of the plantation, as published in technical manuals for pepper production. An index of less than 1 indicates that yield is below the prescribed value.

On the other hand, farmers without agreements are far less dependent on single agricultural activities. They derive income from other commercial crops that enable them to cope with uncertainties related to the pepper market. In summary, the more farmers rely on pepper production for their income generation, the more they need a stable contractual arrangement with a buyer.

Another interesting result of the analysis is that income diversification has a direct effect on contract choice. Income from other commercial crops provides farmers with bargaining power that enables them to refrain from contractual ties, whereas income derived from nonagricultural activities seemingly does not generate the same effect. A possible explanation is that the latter income is composed of several sources, ranging from nonagricultural wage labor to remittances from relatives outside the household. This income composition may restrict its use for production purposes. Conversely, income from other commercial crops is entirely under the farmer's control and can be applied according to his or her own criteria. In addition, off-farm activities restrict farmers' labor availability in critical periods and could thus reduce the labor intensity required for critical crop management practices in pepper production.

Contracts as Incentives

This analysis has shown that contracts provide an important incentive for more intensive input use, but also tend to induce a shift toward hiring wage labor to replace family labor (see Sáenz-Segura 2006, 50, for details on the impact of contracts on pepper production systems). This finding only partly confirms the hypothesis that contracts improve certainty for small-scale producers and hence increase their willingness to invest. The fact that mainly less-endowed farmers choose contracts points in the same direction. Contracts clearly improve access to inputs and information, thus reducing existing market failures. Consequently, contracts could complement policies aiming at more efficient land use systems. Even when farmers are equally informed about suitable land management technologies, those with contracts are likely to implement more soil conservation practices.

It has been argued that different types of contracts may have adverse effects on the adoption of soil conservation measures (Rickson and Burch 1996). Short-term production goals imposed by the processing firms may restrain farmers from adopting soil conservation practices, which usually demand large amounts of labor time. Moreover, markets for specialized inputs and services are usually inaccessible to low-income farmers (Key and Runsten 1999). In the pepper case, products such as organic fertilizers and calcium not only contribute to maintaining good soil conditions, but also help prevent fungi attacks. Farmers facing budget constraints often cannot maintain the whole technical package (that is, fertilizing regimes) designed for export crops and rely more on the exploitation of their soil nutrient stocks.

In the monopsonistic market segment, the buyer offers resource-providing contracts, which mostly focus on seedling provision and technical assistance. Therefore, resource-constrained farmers would look for the insurance of contracts before investing in disease prevention and soil maintenance practices that increase their asset specificity. Actually, the contract functions as a catalytic vehicle to entice these farmers toward risk-taking behavior. In the competitive market segment, one of the buyers offers a resource-providing contract that includes fertilizer and pesticide supply, resulting in higher use of biocides and soil maintenance inputs by contracting farmers. On the other hand, farmers with no agreement pay little or no attention to these practices. A possible explanation is that this category of farmers is younger, has less farming experience, and has more land availability. Even though they achieve higher yields in pepper production, they consider the crop a second-best option from which they derive some additional income while spending little time and limited investments on crop maintenance and soil conservation activities. Farmers without contracts thus sidestep the early nonproductive phases of pepper production and use idle land with good soil nutrient stocks rather than investing in soil maintenance activities.

Contracts for Market Information

The effects of contracts under different market situations show that local monopsonies might generate rather perverse incentives for making fixed investments in pepper plantations compared with situations where competition between buyers exists. Recorded per hectare yields in the monopsony region are substantially lower than in the competitive market region, even when farmers use more inputs. Local monopsonies could favor a transition toward more capital-intensive production systems, especially when relying on resource-providing

contractual regimes that temporarily reduce input costs. This situation points to close complementarities between decisions about technology choice and the type of market organization.

Farmers with no contractual arrangements have less access to market information, use less credit, and are more willing to deviate from a potential agreement with the buyer. Providing accurate information about the required amounts and desired quality characteristics is crucial for efficient product coordination between farmers and buyers (Key and Runsten 1999). Information about the structure of the market is also important to prevent false expectations and adverse selection problems. This need is especially relevant for less-experienced farmers operating in the rather closed and specialized pepper market. Farmers who produce pepper only as a diversification crop can accept the risks associated with missing market information. Hence, they will not allocate many resources to obtaining this information on their own. On the other hand, farmers with contracts are usually better informed and more committed to the agreement with the buyer. Resource-providing contracts are likely to encourage input intensification, particularly in the competitive market segment. Similarly, contracting farmers are less likely to deviate from delivery arrangements, mainly because they are aware of their limited bargaining power in relation to the buyer.

Although asymmetric information is always present between buyers and sellers in developing countries, contracts can provide an appropriate mechanism to cope with market information problems. The loyalty of farmers is likely to be more related to their lack of bargaining power, however, than to the availability of market information. The fixed cost of obtaining accurate market information may be prohibitive for income-constrained farmers, and they are therefore fully dependent on the information provided by the processing firms.

Policy Options

Public and Private Roles for Contract Development

Although contracts are essentially private, there is still an important place for public action to safeguard the efficiency, equity, and sustainability of supply chain cooperation. Contract farming can become an integral part of agrarian policy, where the government, together with the farmers and firms, joins in the effort to create a conducive local production environment. This strategy should include public interventions to regulate market access (that is, to define a framework for legal enforcement and legal resources), to promote farmers' organizations, and to provide information and control (that is, to define minimum public grades and standards). Through these interventions, a framework can be implemented to enhance bargaining power and reduce the institutional risk for smallholder producers willing to participate in contract farming.

With regard to the definition of public grades and standards, it is important to note that in the pepper supply chain, small- and medium-scale processors are dealing with smallholder producers. None of these actors usually has the capital and human capacity to create and implement private grades and standards (G&S), but the implementation of formal grades and standards is key to the future development of the supply chain. Clear rules of measurement defined by a recognized authority and a clear system of classification could improve chain coordination and reduce distrust between contracting parties. In the case of pepper, product quality has been determined by simple visual inspection. These "rules" are informally transmitted to producers by technicians and other experienced producers, and disputes over rejection rates are frequent. Owing to the absence of G&S, this study could not establish a positive relationship between contractual arrangements and quality performance. This situation suggests large inefficiencies in quality assessment procedures and lack of agreement on G&S. The government and local university can play an important role in defining minimum G&S and providing information on new market opportunities and characteristics, while forming a consensus on desired behavior along the supply chain. One strategy for promoting local sustainable production could be to facilitate a variety of contractual terms that are all based on well-established G&S. This strategy would require private-public alliances in pursuit of agreements on product and processing standards.

The government also has a role to play in providing research and development in order to create opportunities for product innovation and differentiation, which tend to be steered by agents close to the retail sector. Therefore governance structures in the production chain could contribute significantly to the government's R&D and thus play an

important role in successful innovation and differentiation.

In general, the government (and voluntary agencies, like NGOs) could strive for greater integration of small-scale producers in the supply chain as part of a strategy of integrated rural development. In the case study presented, the degree of integration is limited and highly dependent on contract terms. Pepper is processed upstream in the chain, and the limited number of processors leads to a quasi-monopsonistic market environment. The level of upgrading is limited to simple compliance with the standards of the domestic processor. All in all, pepper is an attractive nontraditional crop for farmers who wish to diversify, if the contract arrangements provide them an honest price. Pepper can be produced in Costa Rica at relatively low prices, and there is still some unsatisfied domestic demand. Moreover, there is potential for export, but local production is still insufficient for processors to offset the export costs.

Assignment

Your assignment is to recommend a government policy to assure an acceptable level of competition and to facilitate increasing incomes and reduced risks for low-income pepper farmers.

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Chapter Seven
Enhancing Smallholder Farmers' Market Competitiveness in Tanzania (6-7)

by Ibrahim H. Kawa and Loyce M. Kaitira

Executive Summary

Tanzanian agriculture is dominated by small-scale subsistence farming. Like the entire economy, agriculture is in a transition from being a command to a market-based production system. The transition process started in the mid-1980s as part of the economic adjustment and structural reform programs and policies supported by Tanzania's development partners. Despite some impressive macroeconomic achievements resulting from the reform programs, agricultural growth and rural poverty reduction continue to present daunting challenges. Few smallholder producers understand how markets work, and even if they do, they do not have the information they need to participate effectively.

In response to these development issues, the government of Tanzania, in consultation with International Fund for Agricultural Development (IFAD), identified the suboptimal structure and functioning of the agricultural marketing system as a key area for attention. Liberalization policy has removed many of the old certainties but has not yet provided adequate basis for an efficiently functioning alternative. To meet this need, an investment program entitled Agricultural Marketing Systems Development was proposed to remove constraints to effective operation of the agricultural marketing system and to help smallholder producers acquire the tools needed to participate on favorable terms in the open market. The program consists of four components: producer empowerment and market linkages, financial market support services, rural marketing infrastructure, and agricultural marketing policy development.

The producer empowerment and market linkages component was designed to transform agriculture from a subsistence activity to a profitable enterprise in the mindset of smallholder producers by building the management and marketing capacity of these producers and small-scale traders and processors. About 50 percent of all participating producer groups are now well organized, have adopted collective marketing, and can understand which enterprises are profitable. This shift will lead to the commercialization of agriculture. The financial market support services component was created to improve access to financial services for smallholders and small-scale rural traders and processors, and this goal has been achieved among 20 percent of targeted beneficiaries. The rehabilitation of marketing infrastructure, including markets, warehouses, and rural roads, has been 43 percent achieved.

The agricultural marketing policy component was designed to create a conducive policy environment for smallholder farmers to gain access to both domestic and export markets in an organized and sustainable manner, with the help of both financial market support services and infrastructure. Issues that currently impede smallholder farmers' access to markets include a weak legal, regulatory, and institutional framework; poor-quality agricultural products; inadequate entrepreneurial skills; poor facilities for processing agricultural products; poor-quality agricultural marketing infrastructure; and poor access to market information and intelligence.

The program has come up with some policy options designed to facilitate the strategic marketing of agricultural products and ensure fair returns to all stakeholders based on a competitive, efficient, and equitable marketing system. Policy options include harmonizing legislation and regulations to enhance fair and free marketing of food and cash crops; establishing an institutional framework that will improve performance of the agricultural marketing systems based on needs assessments; creating awareness of quality, standards, grades, and governing regulations among agricultural marketing stakeholders; supporting training in entrepreneurial and marketing skills for agricultural marketing stakeholders; promoting primary agro-processing and value-addition chains; strengthening links between local and foreign firms; mobilizing adequate resources for investment in agriculture

and development of agricultural marketing infrastructure in rural areas; and strengthening the Agricultural Marketing Information Services (AMISs) to enhance timely, demand-driven collection, analysis, storage, and dissemination of marketing information.

Through the National Strategy for Growth and Reduction of Poverty, Tanzania aims to reduce poverty by transforming the agriculture-based economy into a market-led, competitive, and semi-industrial economy where smallholder farmers dominate the sector. This approach is strongly supported by Tanzania's development partners, including IFAD and the World Bank. In view of the challenges facing smallholder farmers' agricultural marketing systems, your assignment is to assess the adequacy of the developed policy options in assisting the government of Tanzania to achieve its aim and identify the key policy options for success.

Background

Introduction

Tanzania occupies an area of almost 945,000 square kilometers on the east coast of Africa. It is bounded on the north by Kenya and Uganda, to the south by Mozambique, Malawi, and Zambia, and to the west by Rwanda, Burundi, and the Democratic Republic of Congo. The total population is estimated at almost 35 million, according to the 2002 census. The country is among the poorer countries in Sub-Saharan Africa, with a per capita gross domestic product (GDP) of US$219 in 2006, and is heavily dependent on agriculture (Rutatola et al. 2006).

The Tanzanian agricultural sector is pivotal to the country's economy and social structure. The rural population accounts for almost 80 percent of the total, and more than 90 percent of female rural employment and 78 percent of male rural employment are in the agricultural sector (World Bank 2000). Smallholder farmers dominate the sector. Most of the 4.4 million farm families in Tanzania are engaged in subsistence cultivation of food crops and in cash cropping. The main subsistence crops, which account for 55 percent of total agricultural output, are maize, sorghum, millet, cassava, rice, plantains, and vegetables. The major smallholder cash crops are coffee, cotton, and cashews. The sector's contribution to both GDP and export earnings has been lethargic and almost static. In the face of rapid population growth, currently estimated at 2.8 percent a year, growth in the sector has been insufficient to pull the majority of the rural population out of poverty.

The government has decided to target an expansion in agricultural production as the key mechanism to reduce the country's poverty. It has elaborated a set of policies and actions designed to achieve the following objectives:

1. increase the variety and marketing of food crops to provide food adequate for all;
2. build up and properly manage a national strategic grain reserve;
3. improve the efficiency of production, marketing, and processing of agricultural commodities;
4. strengthen and expand rural social and economic infrastructure; and
5. coordinate and develop different types of agricultural production on the basis of both maximum efficiency and the perceived interests of producers.

Agricultural Policy Trends

According to Rutashobya (2001), since independence in 1961, Tanzania has experienced four distinct phases of agricultural policy.

From 1961 to 1966 government policy was geared at consolidating the marketing systems it had inherited from the colonial authorities. Agricultural policies focused on support to smallholder farmers through government provision of enhanced services, development of government-owned large farms, and continuation of private commercial farming for exports and foreign exchange.

From 1967 to 1983 policies were oriented toward the broad national objective of self-reliance, and the government assigned itself the roles of manager, entrepreneur, and investor. The main policies applied were abolition of direct taxes on smallholder farmers except the produce cess paid to marketing boards, collectivization of small-scale farmers in harmony with the policy of villagization, heavy subsidization of inputs, and pan-territorial pricing for agricultural produce, to mention a few.

In the initial liberalization period (1983–1993), the government redirected policy toward the objective

of developing an egalitarian agricultural community. It aimed at achieving self-sufficiency in food, an improved general standard of living, and greater foreign exchange earnings. A strategic grain reserve was established, and further emphasis was placed on trade policy reform, better management of state-owned enterprises, and initiation of a divestiture program to sell off subsidiary government investments. These changes were accompanied by further liberalization of food and export crop marketing and pricing, removal of crop marketing boards' monopolies, and restructuring or closure of several agricultural parastatals.

After 1994, liberalization continued, characterized by reduced state intervention. Agricultural policy has evolved toward a free-market orientation, coinciding with further macroeconomic reform and government investment in infrastructure. The stated policies were stimulation of growth in the agricultural sector by reversing price distortions, use of the market exchange rate for exports, revitalization of export processing through government divestiture of export-processing industries and an increase in private sector participation, and continued reduction in state participation and control. In addition, the agricultural sector was brought back into the tax base, a change that led to a proliferation of tax charges and levies by government agencies. The most recent comprehensive statement of agricultural policy, published in 1997, had several goals related to agricultural markets:

1. liberalization of all agricultural markets and removal of state monopolies in agricultural trade;
2. withdrawal of government from agricultural production, in favor of the private sector;
3. a focus on regional and household food security;
4. district council responsibility for administration and implementation of agricultural extension; and
5. adoption of a new land policy to improve security of tenure and allocation of land.

Further to the agricultural policy, recently the government of Tanzania developed the Agricultural Sector Development Strategy (ASDS) to stimulate agricultural growth and reduce rural poverty. This strategy focuses on:

1. strengthening the institutional framework for managing agricultural development in the country;
2. creating a favorable environment for private sector commercial activities;
3. clarifying the roles of both the public and private sectors in improving support services; and
4. improving the efficiency of input and output marketing in the sector.

Constraints in Agricultural Marketing Systems

Although Tanzania has made progress in liberalizing the agricultural marketing system over the years, significant constraints to the sound functioning of the system still exist. Amani et al. (1987) observed that the constraints reduce the efficiency of the system in two ways:

1. They have a direct impact by increasing the cost of marketing through, for instance, poor transport infrastructure or impediments to the movement of produce.
2. They have an indirect effect by collectively rendering it more difficult for new entrants to participate and thus reducing competition. Complex and inconsistently applied rules, absence of information, and difficulties in gaining financing, among other factors, all constitute barriers to entry, especially for small market players. With competition limited, cartels are easy to form, and the marketing power of smallholder producers is severely compromised.

Field experience has shown that smallholder farmers face a variety of new challenges in coping with the requirements of a free market. Smallholder farmers are poorly prepared to respond to market mechanisms they only partly understand (such as fluctuations in demand and prices) or to meet the demands of traders for specific product quality and quantity. As a result, individual farmers face difficulties in developing coherent and realistic marketing strategies, particularly when faced with a single trader with considerable economic power. The position of smallholder farmers as market participants is further weakened by their pressing need to meet cash needs after harvesting. Smallholder farmers' commercial management

capacities are generally rather limited because they have been accustomed over many years to controlled marketing structures for inputs and fixed prices for outputs.

Smallholder farmers in Tanzania operate as individuals. They do not have any bargaining power, and their linkages with markets are tenuous. They also have very little information on markets, including produce price, and cannot access credit to enable them to store their produce and sell out of season at higher prices. Smallholder families need to be empowered through the formation and strengthening of producer and small trader groups. Not only would such groups help them obtain higher prices for their produce, but they would also enable them to reach service providers who can supply them with the production, credit, and market services they require to diversify and improve their income. The formation of market linkages between smallholder farmer groups and other market chain actors lies at the crux of improving smallholder returns. The formation of these linkages does not occur easily or spontaneously. It takes time.

Poor market infrastructure, particularly rural roads and village access roads, severely impedes smallholders' access to markets and substantially increases transaction costs. Inadequate village-level market and produce storage facilities are restrictive in some locations.

Existing Efforts to Address Agricultural Marketing Constraints

The government of Tanzania, in collaboration with IFAD, the African Development Bank (AfDB), the Irish government, and beneficiaries, formulated the Agricultural Marketing Systems Development Programme (AMSDP) to address the mentioned constraints within the overall framework of the National Strategy for Growth and Reduction of Poverty. The AMSDP, a seven-year program that is being implemented in two phases, was launched in January 2003 with a completion date of December 2009. The program has been designed to integrate smallholder farmers and small-scale traders and producers into the rural market economy and increase returns from agricultural produce and other market-related activities. It has four components:

1. producer empowerment and market linkages;
2. financial market support services;
3. rural marketing infrastructure; and
4. agricultural marketing policy development.

The long-term goal of the AMSDP is to increase the incomes and food security of the rural poor in selected focal areas of the northern zone covering the Arusha, Kilimanjaro, Manyara, and Tanga regions and the southern zones involving the Iringa, Mbeya, Rukwa, and Ruvuma regions. The program started with 8 districts in 2004 and added 12 districts in the second year. It plans to increase the number of districts to 38 by 2009, covering 30 percent of the entire country.

The first program component—producer empowerment and market linkages—focused on changing the mindset of smallholder producers from perceiving agriculture as a subsistence activity to seeing it as an income-generating activity. Activities under this component have helped to break smallholder farmers' fear of participating in markets. Indeed, transformation of their mindset has been accomplished. About 50 percent of all participating producer groups are now well organized, have taken on collective marketing, and can understand which enterprises are profitable. This change will lead to the commercialization of agriculture. Smallholder producer groups have the ability to do gross margin analysis, record keeping, and financial management.

The financial market support services component was designed to improve access to financial services by smallholders and small-scale rural traders and processors. One of the recorded achievements so far is that about 20 percent of producer groups have started savings and credit cooperative societies (SACCOSs) and operate warehouse receipt systems (WRSs). Funding to SACCOSs has been increased, and the loan terms by SACCOSs for producers have improved. Farm-gate prices for crops that are stored have almost doubled.

The activities of the rural marketing infrastructure component, like any other component, were implemented based on beneficiary demand and driven by the private sector. These activities gave priority to rural access or feeder roads that link marketplaces to productive areas in the districts. The selections were mostly in keeping with district

development plans, which start from the village level to ensure transparency and the relevancy of the targeted groups. To date, 13 rural feeder roads have been rehabilitated, totaling 290 kilometers—43 percent of the earmarked 675 kilometers of roads. Rehabilitation of warehouses has been 40 percent achieved, and that of markets, 45 percent.

The marketing policy development component was aimed at creating a policy environment that would allow all market actors at both the local and national level to gain access to domestic and export markets. Despite notable achievements in the first three components, there are still some policy issues to be resolved to enable smooth functioning of the agricultural marketing sector. Thus, those issues were highlighted and options were sought.

Policy Issues

The existing agricultural policy setting has given rise to a number of policy issues.

The Legal and Regulatory Framework

There is a need for simplification of business licensing, registration, and import/export procedures, as well as improvement of commercial dispute resolution. Enforcement of local taxes has been inconsistent, creating unfair competition. Furthermore, some stakeholders in the public and private sectors are not aware of existing laws and regulations and their implications and thus do not comply. Consequently, there have been few incentives for innovation in terms of input supply, credit mechanisms, and contract farming. This lack of compliance has also led to a lack of cohesion in the agricultural marketing subsector and the existence of a large number of informal traders in agricultural marketing.

The Institutional Framework

Since the inception of the policy favoring a liberalized marketing system, key institutions involved in agricultural marketing have included agricultural sector lead ministries, commodity boards, producers, traders, processors, marketing associations, financial institutions, civil society organizations, and other service providers. Despite good government intentions, the public institutions involved in agricultural marketing have a number of shortcomings:

1. weak harmonization and poor coordination among the reformed institutions;
2. weak institutional capacities in terms of staffing and technical and managerial skills among government ministries, departments, and agencies; and,
3. difficulty shifting mindsets from a control economy to a market-led economy.

The private sector in Tanzania is evolving to undertake commercial and business activities that were previously run by government institutions. The commercialization of agriculture requires proactive private sector institutions that are able to seize emerging opportunities and address associated risks in local, regional, and world markets. It will require the participation of small- and large-scale farmers, farmers' groups and associations, processors, traders, transporters, cooperative societies, nongovernmental organizations (NGOs), and civil societies. The government is determined to create an enabling environment to facilitate effective private sector participation in agricultural marketing activities. Nonetheless, the private sector institutions are faced with the challenges of poor representation of key stakeholders in agriculture fora and various committees; weak capacity in policy advocacy and lobbying; poor leadership and weak management capacity; inability to foster marketing groups and associations; and inadequate technical and financial resources.

Agricultural Products Quality and Standards

Agricultural production is characterized by poor adherence to product standards and grades and inadequate postharvest management. In addition, Tanzanian farmers' difficulty in adhering to food hygiene and sanitary and phytosanitary requirements adversely affects the exporting and marketing of agricultural products. Product quality inspection is weak at the buying posts, where some market actors violate standard units of measurement and grades. To address these shortcomings, the government has several ongoing interventions, including establishing crop and animal disease-free zones, packaging services with identification and traceability systems, and establishing accreditation systems.

Entrepreneurial and Marketing Skills

Smallholder farmers are characterized by inadequate levels of entrepreneurial skills and inability to cope

with market dynamics. Many smallholder farmers keep producing the crops they have traditionally produced and continue searching for markets for these products even when the market requires improved or entirely different products. Farmers usually turn to marketing concerns only later, when the output has already been produced. Entrepreneurial and marketing skills are also inadequate among other actors, including traders and processors. Developing entrepreneurial and marketing skills among these various actors will lead to an improvement in agricultural marketing. The government and the private sector are the key players in enhancing agribusiness skills among the various actors in agricultural marketing.

Processing of Agricultural Products

Tanzania continues to produce mainly agricultural raw material, not only for cash crops targeting external markets, but also for food products targeting domestic markets. Value addition is still underdeveloped. Domestic demand for agroprocessed products, particularly food products, however, is increasing both in rural and in urban areas. The emergence of supermarkets and fast food outlets is by itself an indication of the changing patterns of consumption of agroprocessed products. Domestic market actors have not been able to take advantage of these emerging marketing opportunities. Thus, among other things, research on and promotion of value addition in the areas of processing, packaging, handling, and storage using appropriate technologies can have a significant impact on how well actors exploit emerging market opportunities. Value addition chains can effectively link smallholder producers with traders, processors, retailers, and consumers.

Agricultural Marketing Infrastructure

Marketing infrastructure in the country is generally poor and inadequate for the development of efficient agricultural marketing systems. It fails to effectively connect production and consumption areas, thus increasing marketing costs. In areas with potential for greater agricultural production, rural road networks are not developed and maintained and rural markets are inadequate and lack necessary facilities. The lack of adequate storage facilities, agroprocessing plants and industries, reliable transport infrastructure, and equipment exacerbates wastage of perishable agricultural products such as fruits and vegetables.

Agricultural Marketing Information and Intelligence

Currently, Tanzania is faced with weak and inadequate market linkages among key stakeholders, including farmers, processors, consumers, exporters, and importers. These weak links cause a mismatch between the supply chain and market demands. As a result, smallholder farmers, unlike large-scale producers, are supply oriented and slow in adapting to changes in market demands. Agricultural marketing research and intelligence are important for informing farmers and traders about the products and market segments that will be most profitable and hence are important tools for marketing linkages. Research and intelligence are currently, however, weak and inadequate.

Stakeholders

The AMSDP recognizes that for development to be sustainable, it must enhance the capacity of smallholder producer groups to initiate action to improve their own situation. Consequently, the producer empowerment component deals with attitude change before embarking on marketing activities. The key stakeholders consist of smallholder farmers, producer groups, and grassroots institutions, as well as small-scale trader and processor groups operating in rural areas. Other stakeholders include the government of Tanzania, IFAD, the AfDB, the Irish government, and the private sector.

Smallholder Farmers

Smallholder farmers, whose average cropped area does not exceed two hectares, are the program's prime target group. These farmers are expected to benefit directly from improved access to markets on better terms. The rest of the rural population, however, will also benefit from improved rural market support infrastructure, better access to information, and their own efforts based on what they see and learn regarding changes made by smallholder farmers.

Small-Scale Trader and Processor Groups

Groups of small-scale traders and processors engage mainly in agribusiness operations working in local trading centers. In their trading, processing, and transporting activities, these groups handle significant amounts of agricultural produce. Their activities contribute to an improved market

environment for the local small-scale producers and entrepreneurs.

The Government of Tanzania

The government of Tanzania formulated the AMSDP to address the agricultural marketing system inefficiencies within the overall framework of the National Strategy for Growth and Reduction of Poverty. AMSDP pioneered the approach of implementing a government program through NGOs and private companies. This is in line with the government's strategy of promoting private sector–led growth.

Development Partners

Development partners include the donor community—that is, IFAD (the major donor), AfDB, and the Irish government—and the private sector. IFAD's Strategic Framework for 2002–2006, entitled "Enabling the Rural Poor to Overcome Their Poverty," lists increasing the access of poor rural people to financial services and markets as one of its three major thrusts. This priority is reflected in IFAD's Regional Strategy for East and Southern Africa (March 2002), which includes promoting efficient and equitable market linkages and developing rural financial systems as two of its four strategic thrusts within the region. The strategic framework calls for supporting these thrusts or objectives by generating catalytic impact through field operations as well as policy dialog and advocacy on behalf of the rural poor.

The AMSDP has a public-private partnership (PPP) arrangement. The AMSDP has applied a portion of its funds to eligible private sector actors, here called partner agencies (PAs), to facilitate its implementation. One such PA is the Traditional Irrigation and Environmental Development Organization (TIP). Responsibilities of PAs include

1. improving the organizational capacity of the target groups (groups should ideally comprise 20–30 members from the same village or community to ensure familiarity, cohesion, trust, and confidence);
2. analyzing and defining the actual purpose of each set of groups;
3. helping groups achieve legal status or personality to allow them to, for example, enter into legal relationships, open bank accounts, or take out loans (legal registration of the groups, however, is not necessary);
4. identifying the participating smallholders and small-scale traders based on the criteria and proposals describing the planned activity;
5. communicating the local groups' training requirements to the Program Coordination Unit (PCU), together with group-based proposals or applications for producer group associations;
6. training field officers of partner agencies in participatory techniques, group dynamics, governance, and report writing; and
7. facilitating field officers' attendance of "training of trainers" courses to build their skills in reaching audiences, before commencing group-strengthening activities.

Policy Options

The development of an efficient, effective, and equitable agricultural marketing system is a prerequisite for fostering market-oriented agriculture's contribution to income generation and poverty reduction. Pursuant to this goal, the AMSDP, in collaboration with other key stakeholders, has formulated agricultural marketing policy options.

Legal and Regulatory Framework

The objective of the legal and regulatory framework is to enhance the competitiveness of the food and cash-crop marketing systems. The policy options include

1. enacting legislation and regulations governing the marketing of food and cash crops;
2. harmonizing legislation and regulations to enhance fair and free marketing of food and cash crops; and
3. reviewing and rationalizing existing legislation and regulations, as well as enforcement mechanisms governing food and cash-crop marketing, to enhance efficiency, transparency, coherence, competition, and compliance.

Institutional Framework

The objective of the public and private institutional framework is to enhance efficient performance of the agricultural marketing system. The policy options include

1. establishing an institutional framework that will improve performance of the agricultural marketing systems based on needs assessments;
2. reforming commodity boards to make them accountable to industry stakeholders;
3. strengthening public-private partnership dialog in the agribusiness development agenda; and
4. facilitating the development of private sector capacity to participate more effectively in the process of better regulation through public-private partnerships and improved advocacy.

Agricultural Product Quality and Standards

The objective is to enhance the quality and standards of agricultural products produced and marketed. The policy options include

1. improving the capacities of agricultural marketing actors to meet local, regional, and international standards;
2. creating awareness about quality, standards, grades, and governing regulations among agricultural marketing stakeholders;
3. encouraging stakeholders to use designated buying posts for agroproducts;
4. promoting product quality and enforcement of grades and standards; and
5. collaborating with other partner states to develop and harmonize local, regional, and international standards.

Entrepreneurial and Marketing Skills

The objective is to enhance the entrepreneurial and marketing skills of agricultural marketing actors. The policy options include

1. supporting training in entrepreneurial and marketing skills for agricultural marketing stakeholders;
2. promoting private sector participation in the training of marketing actors in entrepreneurial and marketing skills; and
3. promoting and strengthening entrepreneurial and marketing skills in vocational training centers, colleges, and other relevant learning institutions.

Processing of the Agricultural Products

The objective is to enhance value addition to agricultural products and marketing. The policy options include

1. promoting and strengthening primary agroprocessing and value addition chains and linking them with both local and foreign firms;
2. promoting investment in research and development (R&D) on production, processing, storage, packaging, and handling technologies;
3. promoting domestic consumption of locally processed agricultural products;
4. reviewing and strengthening the legal framework governing agroprocessing activities; and
5. facilitating the promotion of locally processed agricultural products in local, regional, and international markets.

Agricultural Marketing Infrastructure

The objective is to improve and develop agricultural marketing infrastructure. The policy options include

1. mobilizing adequate resources for investment and development of agricultural marketing infrastructure in rural areas;
2. creating an enabling and conducive environment for private sector involvement in developing and expanding agricultural marketing infrastructure, including storage, processing, telecommunications, marketing centers, and roads;
3. promoting community participation in the development, implementation, operation, and maintenance of agricultural marketing infrastructure.

Agricultural Marketing Information and Intelligence

The objective is to enhance high-quality and timely agricultural marketing information services to facilitate marketing functions. The policy options include

1. strengthening the Agricultural Marketing Information Services (AMISs) to enhance timely, demand-driven collection, analysis, storage, and dissemination of marketing information;
2. promoting and strengthening public-private partnerships in undertaking marketing research and information systems for both agricultural inputs and outputs; and
3. promoting the use of information and communication technologies in collection, analysis, storage, and dissemination of data and information.

Assignment

Through the National Strategy for Growth and Reduction of Poverty, Tanzania aims to reduce poverty by transforming its agriculture-based economy into a market-led, competitive, and semi-industrial economy where smallholder farmers dominate the sector. This goal is strongly supported by Tanzania's development partners, including IFAD and the World Bank. In view of the challenges facing smallholder farmers' agricultural marketing systems, assess the adequacy of the developed policy options in assisting the government of Tanzania to achieve its aim, and identify the key policy options for success.

Additional Readings

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Chapter Eight
Food Price Stabilization Policies in a Globalizing World (6-8)
by Shahidur Rashid

Executive Summary

This case examines various aspects of food price instability. It focuses on (1) the sources of price instability, (2) various policy options and the conditions under which they are viable, and (3) experiences with both market-based and non-market-based policy responses to price instability. All sources of price instability—such as inadequate infrastructure, asymmetric information, and incomplete or missing institutions—qualify as market failure. One could therefore argue that an appropriate policy response would be to invest in the critical determinants of well-functioning markets and create enabling market conditions, which in turn improve price stability. But the proponents of direct government interventions have argued that it takes time to develop infrastructure, improve information flow, and build institutions, and hence direct intervention for price stabilization is a legitimate short-run policy response. This is the idea most developing countries adopted when they embarked on food price stabilization policies in the 1960s and 1970s.

Over the years, however, it became clear that such policies are expensive, may be dictated by special interests, and can distort agricultural incentives. These problems were particularly relevant for marketing board–led price controls in centrally planned economies. In Asian countries, most of which adopted dual pricing policies, interventions did produce beneficial results during the early years of the Green Revolution. But recent studies suggest that Asian food price stabilization is plagued by the very problems that the opponents had predicted with their theoretical models. These programs are becoming increasingly expensive, being captured by special interests, and hindering the process of diversification and commercialization. Furthermore, some countries in the region have demonstrated that reductions in public intervention can be beneficial. The Asian countries that adopted liberalization have been able to reduce food subsidy bills, strengthen markets, and allocate more resources to poverty alleviation programs—all without jeopardizing food price stability.

Given the policy vacuum created by liberalization and the increasing affordability of information and communication technologies, recent years have seen many initiatives in developing countries to set up market-based institutions, such as commodity exchanges, for managing price instability and risks. Some countries have also used international futures markets to protect their domestic market against global market volatility. In most cases, however, these initiatives have not produced the desired results, and addressing price instability continues to be a challenge for many developing countries. This case provides an overview of these challenges with the hope of stimulating critical thinking about policy solutions that can ensure an acceptable level of price stability, especially in low-income countries in Africa.

Your assignment is to consider a low-income, landlocked country in Africa with poor infrastructure and to recommend a set of policies to the government that would ensure an acceptable level of price stability for agricultural commodities. For decades, the country controlled agricultural prices through its marketing boards, which heavily distorted agricultural production incentives. Beginning in 1999 the country started dismantling its marketing boards and liberalizing agricultural markets. With liberalization, however, prices have become more volatile, and there has been increasing pressure on the government to undertake stabilization policies.

Background

Agricultural households in developing countries face a variety of risks. The most visible manifestation of these risks is high food price instability, which, because of its inherent economic and political implications, has attracted the attention of almost all actors in food policy making over the past few decades. Politicians want food price stability irrespective of their ideology; public administrators have struggled to make food price policies work; and researchers have debated the ways and

means of ensuring food price stability. All actors agree on one point—the dire consequences of price instability for consumers, producers, and overall economic growth. It is well documented that if the markets for credit and insurance are incomplete, commodity price instability can discourage investments and lead to inefficient resource allocation.[1] For poor consumers, the consequences of price instability can be severe. Because they spend a large share of their income on food, an unusual price increase forces them to cut down food intake, take their children out of school, or, in extreme cases, simply to starve.[2] A series of country studies have argued that price instability may result in macroeconomic instability, social unrest, and overall reduction in economic growth.[3]

Thus, the issue is not finding policy justifications for ensuring price stability, but rather finding appropriate policy instruments and institutions to address it—a subject that was intensely debated in the 1970s and 1980s and has received renewed attention in recent years.[4] The traditional policy response has consisted of direct government interventions in food markets, through food marketing boards or parastatals, involving price controls and restrictions on both internal and external trade. Beginning in the 1980s, donors and other international agencies began promoting the reform of the food marketing boards and price policies as part of structural adjustment programs. This approach was motivated by the prevailing view at the time that direct marketing interventions in the food sector were too costly to continue. The reform experiences have been mixed, and whether the reforms provided positive price incentives is a subject of considerable debate (Barrett 1997; Jayne et al. 2002; Dorward et al. 2004).

In light of these mixed experiences with structural adjustment programs as well as other global trends, it is being increasingly recognized that food price instability and risk are important problems in many low-income countries, and finding appropriate policy responses for dealing with these problems has re-emerged as a contemporary policy issue (Byerlee et al. 2006; World Bank 2005). There are at least three reasons behind renewed interest in the subject. First, it is becoming evident that food market reforms have been partial, and in the wake of increased price volatility, many countries are reversing the policies they adopted under the structural adjustment programs.[5] Second, world grain stock is at historically low levels, and even a relatively small swing in exports or imports from large countries, such as China and India, can send major shock waves through world grain markets. This vulnerability has serious implications for developing countries, especially those that have food deficits and limited capacity to import owing to low foreign currency reserves. Finally, there is growing concern that global climate change is likely to expose poor countries to droughts, floods, and other extreme climatic events that can increase the risk of food price shocks.

Instability in agricultural prices results from a number of interrelated factors. It is important to note that such instability can often be triggered by one factor, like bad weather, and then be accelerated by other related factors, such as inadequate infrastructure and institutions. Broadly, one can divide these factors into four major groups: (1) agroclimatic factors, (2) inadequate infrastructure and asymmetric information, (3) incomplete or missing institutions, and (4) high volatility in the world market.

Agroclimatic Factors

The hostility of Mother Nature has historically been one of the main sources of peasant households' vulnerability. Droughts, floods, and endemic infestations of crops have always played roles in food insecurity and resultant human tragedies. The production from weather-dependent agriculture, as is the case in most developing countries, can be as unpredictable as the weather

[1] For further details, see Newbery and Stiglitz (1981), Timmer (1988), Williams and Wright (1991), Fafchamps (1992), and Barrett (2002).

[2] Even if these shocks are temporary, they can have long-term economic impacts in terms of nutritional well-being, labor productivity, and survival chances (Hoddinott 2006).

[3] This has been a main theme of Peter Timmer's research for more than two decades. For Indonesia, he demonstrated that a stabilized rice price raised the country's growth rates by 16 percent during 1969–1974, by 14 percent during 1974–1979, and by 4 percent during 1989–1991 over what it would have been otherwise (Timmer 1997). For further discussion of the social and political justifications for price stabilization, see Timmer (1988, 1996).

[4] See Timmer (1988, 1996) and references therein on the debate and World Bank (2005) on recent issues.

[5] See Jayne et al. (2002) for Eastern and Southern African experiences.

itself, as shown by the variability in production within and across years. It has been amply demonstrated that yield variability translates into price variability, and the more a country's agriculture depends on weather, the more variable yields and prices are.[6] The reasons are obvious when one observes how prices collapse following a bumper harvest and skyrocket after a crop failure.[7]

Infrastructure and Information

The price of any given commodity is the final outcome of an exchange process we call the market, and the outcome is only as good as the process is able to deliver. Thus, the price of a commodity can be right only if the process of exchange is right. Three critical determinants of an efficient process of exchange (or market) are infrastructure, institutions, and information.[8] Two examples can help make the point clear. First, the results of the "getting-prices-right" campaign of the 1980s, which involved dismantling parastatals and allowing market forces to determine prices, varied widely across countries. Whereas liberalization led to higher price variability and subsequent policy reversals in some African countries, it was remarkably successful in China and Vietnam—arguably because they had better infrastructure and institutions. Second, famines and acute food insecurity have historically been localized phenomena, and many of them are named after a specific region of a country, such as the Wello famine in Ethiopia and the Bengal and Madras famines in India. The classic example is the Bengal Famine of 1943, which tragically demonstrated how a small decline in food production can trigger massive food insecurity in the absence of infrastructure, information, and risk-mitigating institutions. Food price stabilization policies have their roots in such tragic experiences.

Incomplete Markets: Credit and Insurance

Life always involves risks, but over time the human race has learned how to manage or cope with them. The credit and insurance markets are the outcomes of such human learning. In developing countries, however, these institutions are largely incomplete or nonfunctional, and thus inadequate to address the credit and insurance needs of the vast majority of households. This failure indirectly contributes to agricultural risks and price instability. For instance, if the credit market functions well, households can borrow to maintain a certain level of consumption or to avoid distress sales in the face of negative income shocks. In many developing countries farmers must sell a portion of their crops immediately after the harvest to pay off loans, pay wages or school fees, or meet other social obligations. This is one of the reasons behind the stylized fact that prices decline after harvest in developing countries. Furthermore, a large body of literature argues that access to credit markets can reduce or delay the loss of productive assets through distress sales, which are detrimental to long-run productivity and growth.

The same argument applies to insurance markets. Farmers in developing countries have great difficulty dealing with weather-related income shocks owing to missing insurance markets. Crop failure due to drought, for example, can force households, otherwise above the poverty line, into poverty because they must sell their productive assets to meet consumption requirements and production costs. As the next section will show, the development of credit and insurance markets is also critical to ensure food price stability through market-based institutions.

The Volatility of the World Food Market

The world staple food market has historically been thin, highly volatile, and heavily influenced by agricultural policies in developed countries (Timmer 1996). This description was particularly true in the 1960s, when only about 6–7 million metric tons of rice, 46 million tons of wheat, and 23 million tons of maize were traded in the world market. The global market has increased in size over time (almost three times its size in the 1960s), but it remains volatile, with intrayear coefficients of variation reaching as high as 20.73 for rice, 16.9 for wheat, and 17.47 for maize over the past two decades.[9] Many studies have documented that high variability in world prices can be transmitted to domestic markets and worsen price instability. For net importing countries, the financial and balance-of-payments implications can be severe. For example, a sudden increase in food imports may worsen the balance of trade, causing a devaluation of the

[6] See Anderson and Hazell (1989) on sources of yield variability.

[7] The consequences of such shocks on the poor are also well documented. See Barrett (2002) for a review.

[8] Strictly speaking, these are not sources of price instability per se, but the lack or inadequacy of these elements amplifies the degree of instability.

[9] Calculations are based on data from the U.S. Department of Agriculture Foreign Agricultural Service.

currency and making imports more expensive in local currency (Hazell et al. 2005).

Other Factors Contributing to Price Instability

Two other factors can contribute to food price instability in developing countries. First, most developing countries have social safety net (SSN) programs to provide poor households with access to food. These programs are essential for all countries, irrespective of their level of development. If they are not managed properly, however, their operations can have destabilizing effects on markets, especially if the programs are large relative to the country's food economy. Although the direction of the price change may be different, both food transfers and cash transfers under SSN programs can affect the price. For instance, if beneficiaries receive food under SSN programs, it will lower their effective demand from the market, which in turn will lead to a decline in prices. If it is a cash transfer program, on the other hand, increased income will lead to an increase in demand and, for a given level of supply, an increase in prices. Thus, in either case, the market equilibrium will change, which in turn will change farmers' incentives and traders' arbitrage opportunities.

The other factor is food aid flow. Although the benefits of food aid supply during emergencies cannot be denied, excessive flows can depress market prices to the detriment of local producers, lowering levels of production and farmer incomes. This is particularly true for program food aid, which has historically been driven by the disposal of surpluses in donor countries rather than food security needs and incentives for domestic production in recipient countries. Consider the case of Ethiopia, one of the largest recipients of food aid. According to a conservative estimate, total food aid accounted for 13 percent of cereal use in the country during 1999–2003. The share of food aid in total human consumption is at least twice as high, because in addition to human consumption, cereal use includes feed, seed, and postharvest losses (FAO 2004). Clearly, it is a large share and, depending on the mode of distribution, can produce disincentive effects for both producers and traders.

Policy Options

From a theoretical standpoint, the central rationale for policy intervention to ensure price stability lies in the arguments of "market failure." In fact, three commonly cited rationales for public interventions in agricultural markets—(1) inadequate infrastructure, (2) incomplete risk-mitigating institutions like credit and insurance markets, and (3) lack of safeguards against external shocks—can all be argued as cases of market failure. The current stock of agricultural price stabilization policies includes both market-based and non-market-based options, with the former generally practiced in developed countries and the latter in developing countries.[10] A summary of available policy options is provided in Table 1, and each of the options is discussed here.

Non-Market-Based Options

In the age of liberalization and globalization, a discussion of non-market-based policies is likely to be labeled outdated and old-fashioned. There are at least three important reasons, however, for such policies to be considered. First, non-market-based intervention does not contradict the theories of market economics. Economic theory tells us that, in the absence of the provision of public goods and services, the invisible hand of the market is incapable of ensuring efficient allocation of resources. In such a situation government interventions can theoretically be justified.[11] Second, existing World Trade Organization (WTO) regulations allow developing countries to adopt non-market-based policies, including imposing variable levies within stipulated bands, maintaining strategic food reserves, and giving subsidies for market development. Finally, although they have come under intense criticism in recent years, Asian countries had remarkable success with some of these policies during the early years of the Green Revolution. Table 1 summarizes four such policy options, and three of them are discussed here.

[10] In some countries, such as India and Kenya, market-based and non-market-based policy options seem to coexist. Little is known, however, about how they affect each other.

[11] The problem historically, however, has been over-intervening in the market, often resulting from pressure from special interests and rent seeking—a common problem some Asian countries are confronting today.

Government involvement in the sale and purchase of food. Direct government interventions, through the sale and purchase of food, have been the main mechanism for stabilizing food prices in developing countries. The two most common forms of policy interventions are marketing board–led price stabilization in many African economies and dual pricing policies in many Asian countries. These methods of price stabilization came under intense criticism in the 1980s and 1990s, because they were found to be extraordinarily expensive and yet ineffective in generating benefits for the poor (Bates 1981; Newbery and Stiglitz 1981; Pinstrup-Andersen 1988).

The dual pricing policies are perhaps the most widely discussed and debated form of agricultural policy in the past four decades. Unlike marketing board–led policies, these policies provided a much-needed boost to agricultural production and received recognition from policy makers, analysts, and academicians.[12] The policy essentially works as follows: ensure a floor price (often equal to the cost of production) and a ceiling price (set by adding certain margins to the cost of production) through public food procurement, stocking, and distribution. The public procurement ensured a floor price (for instance, in the case of a bumper harvest), stocking ensured the meeting of emergency food security needs, and distribution ensured a regular supply of food for social safety net programs for the poor.

Although it may sound simple, implementing dual pricing policies involves coordinating a complex set of policies, building related institutions, collecting highly disaggregated data, and monitoring both domestic and global prices. For instance, many Asian countries have agricultural price commissions that are responsible for collecting relevant data and setting up floor and ceiling prices; food logistics agencies that are responsible for procurement, stocking, and distribution; and a line ministry that designs safety net programs and identifies beneficiaries.

How are dual pricing policies different from marketing board–led price control in centrally planned economies? They differ in three important respects. First, unlike centrally planned economies, food logistics agencies in Asia did not eliminate private trading in the agricultural sector. For example, in the 1970s the food logistics agencies' shares in cereal production in India and Indonesia were only 10 percent and 3.54 percent, respectively (Rashid et al. 2005). The rest was traded by the private sector. Second, countries that practiced dual pricing policies never imposed production quotas on the farmers, a practice that was common in centrally planned economies. Finally, price stabilization policies in Asia went hand in hand with investments in infrastructure and market development. This approach is evident in the growth trends of road networks, irrigation facilities, and information and communication technologies. It is also supported by the recent studies of food market integration in Asia, almost all of which suggest that cereal markets have become well-integrated in the past two decades, which is remarkably different from the earlier decades when the countries embarked on dual pricing policies.[13]

Strategic food security reserves. The strategic food security reserve (SFSR) is a policy response to food security threats arising from weather-related disasters (such as droughts and floods) or human-induced disasters (such as civil strife), both of which are prevalent in many developing countries in Africa and Asia. In Africa, maintaining SFSRs became a high-profile policy when the African heads of state and government passed a resolution establishing a regional food security reserve during the African Union summit held in Maputo, Mozambique, in July 2003. The rationales for maintaining SFSRs are similar to those for price stabilization, but they substantially differ from those for dual pricing policies. Although the focus of SFSR operation is mainly on emergency assistance and disaster management, dual pricing policies coordinate policy action across economic sectors. In particular, in addition to maintaining security reserves for emergencies (commonly called buffer stocks in Asia), dual pricing policies link farmers, through the minimum price guarantee, and consumers, through SSN, as part of the price stabilization mechanism.

Implementing this policy raises a number of challenges. It can be expensive and have disincentive effects on producers and private traders if stocks are not rotated and released in a timely and market-friendly manner. The direct costs of managing such reserves are easy to understand with a simple example. Suppose that a country maintains 450,000 metric tons of cereal reserves for

[12] See Timmer (1988) and Barrett (2002, section 3) for a review.

[13] A summary of these studies for six Asian countries is presented in Rashid et al. (2005).

emergency management and that policy makers know, based on historical evidence, that emergencies occur once every four years. Now, international evidence suggests that the average cost of storing one metric ton of cereal is US$30 per year. That is, the cost of maintaining food security reserves is US$13.5 million per year or US$54.0 million (over four years) to address one emergency. These are conservative estimates, because they exclude other costs, such as storage losses, disincentives, or even potential corruption or misuse of the stocks.

Does this mean that one should abandon such policies? The answer, as in any policy debate, depends on country-specific realities. If a country is well integrated with the international market and has the capacity to import, such policies are irrelevant. If, however, a country is landlocked and weakly integrated with regional or world markets, maintaining food reserves may be necessary to save human lives, to which no one can objectively attach a financial value. Thus the objective in such a situation will probably be to find ways to minimize the adverse effects. Four commonly advocated options are (1) announcing the sale or release price before the main planting season, (2) setting the price around the expected import parity price, (3) rotating the stock through sales at import parity and tendering for commercial imports, and (4) strengthening the legal framework to minimize the scope for corruption, such as collusion between traders and officials to exploit the system.

Variable tariffs. International trade, especially involving the private sector, has long been recognized as an efficient means of stabilizing domestic food prices. Trade flows add to domestic supplies in times of shortage (or provide additional markets in times of surplus), with adjustments in tariffs providing a mechanism to influence both traded quantity and prices.[14] The key term in this statement is "adjustment of tariffs." From the perspective of trade theory, high tariffs on any commodity can create distortions in the respective sectors.

Nevertheless, given the weak agricultural base and high instability of world cereal markets, most developing countries cannot afford to leave their agricultural markets completely open. For instance, if a bumper harvest in a country coincides with low import parity prices, domestic prices can be further depressed and farmers may fail to recover their production costs. In a resource-poor, agriculture-dependent country, such an outcome can be a big blow to the economy. This possibility is the underlying reason WTO regulations allow developing countries to apply tariffs within a band. The critical condition required to make this policy viable is a good market information system that can monitor both domestic and international prices, forecast domestic production, and allow for quick decisions on tariff adjustments.

Market-Based Options

The market-based options and institutions used in most developed countries to mitigate price risk evolved in response to the conditions observable in many developing countries today. Writing on the history of futures markets in the United States, Kline (2001, 3) notes:

> ... grains were typically sown in the spring and harvested in the fall. In the 1800s, this created extreme supply and demand imbalances throughout the year. During the fall, when supplies were plentiful, prices of grains were extremely depressed. Millers had an abundance of new crops to choose from and would pay the lowest price they could. In fact, many farmers were left with cartloads of unsold grains that they were not willing to haul back to their farms. Sometimes the grains were left on the roadside to rot.

This story is similar to what Ethiopian farmers experienced during the harvesting season of 2002, when prices were so low that many farmers allegedly did not find it worthwhile to harvest and hence left their crops in the field to rot. History offers many examples of this sort, but they never translated into policy action to develop market-based institutions in developing countries. The reasons were simple: developing countries did not have the technology and the institutions—such as credit, insurance, and contract enforcement—that are critical for the success of market-based mechanisms. In fact, it was not easy even for developed countries. For example, although the first forward contract was made on March 13, 1851, at the Chicago Board of Trade (CBOT), it was only in 1972 that the CBOT and the Chicago Mercantile

[14] See Minten and Dorosh (2006) for an analysis of rice price stabilization policy in Madagascar; Dorosh (2001) for an example of how private trade with India helped stabilize rice prices in Bangladesh; and Jha and Srinivasan (1999) for an analysis of the welfare and efficiency implications of Indian grain price policies.

Exchange (CME) developed contracts that were able to hedge against currency and interest rate volatility (Kline 2001).

Now, however, technologies that were beyond the reach of developing countries, such as information and communication technologies, are becoming more affordable; banking and financial sectors can be developed rapidly; and new markets are emerging in Brazil, China, and India. These factors are creating unprecedented opportunities for developing countries to set up market-based institutions. Yet developing countries continue to face difficulties in taking advantage of these opportunities.

Warehouse receipt system. The warehouse receipt system (WRS) is an institutional mechanism to mitigate some sources of price instability, namely credit constraints. As mentioned earlier, one of the main reasons for observed low prices after harvest is the fact that farmers, especially small farmers, are forced to sell a portion of their harvest to pay for laborers, pay off loans, and meet other social obligations. And when agriculture is dominated by smallholders, excess supply is created, which leads to depressed prices or even price collapse in certain years. If farmers were not credit constrained, they could store their harvest and wait for arbitrage opportunities over time. An efficient WRS can help farmers do exactly that. The idea is simple. After the harvest, farmers take their surplus to a designated warehouse and get a receipt indicating the value of the stock, which can then be deposited in a bank to get cash.

Providing farmers with warehousing facilities in developing countries offers an added advantage. In most developing countries, post-harvest losses are high—sometimes as high as 30 percent of gross production. Consider the case of Ethiopia, where estimates of post-harvest losses range from 20 to 30 percent of gross cereal production. Total gross production of cereal in the country is about 10 million metric tons. Assuming an average cereal price of US$200 per ton, this implies that the country loses about US$400 million worth of cereals in a given year. With appropriate harvesting, warehousing, and postharvest techniques, these losses could have been minimized, contributing to the well-being of both producers and consumers.

Commodity exchanges and futures markets. The futures market as it exists today is a contractual arrangement where farmers (sellers) and dealers (buyers) commit to future exchanges of grain for cash. For example, a farmer may agree with a dealer on a certain price to deliver a given quantity of wheat at the end of a pre-fixed time. If the bargain suits both parties, the farmer knows how much she will be paid for the wheat and the dealer knows his costs in advance. The two parties may exchange a written contract to this effect and possibly a small amount of money representing a "guarantee."

Such contracts have become common and are even used as collateral for bank loans. They can also change hands before the delivery date. If the dealer decides he does not want the wheat, he can sell the contract to someone who does. Similarly, if the farmer does not want to deliver her wheat, she can pass her obligation on to another farmer. The price fluctuates depending on what is happening in the wheat market, and the participants can use the price information to react accordingly. In simple terms, this is how commodity futures work, but successful implementation requires (1) a system of grades and standards, (2) a large domestic market, (3) well-functioning credit and insurance markets, (4) a strong legal environment for contract enforcement, and (5) good information and communication infrastructure.

Given these stringent viability conditions, can such a system work in a developing country? If the current Western level of sophistication is taken as standard, the answer is probably "no." Going back in history, however, offers grounds for optimism about the prospect. For example, in the mid-1800s, when commodity exchanges evolved in the United States, all the viability conditions listed were either missing or at a low level of sophistication. Yet the institutions evolved and even flourished over the past century and a half.[15] Thus, if history is any indicator, commodity exchanges do have potential. The key challenges will be coping with small market size (most African countries have small markets) and creating an enabling legal and regulatory environment, which many countries lack.

Crop insurance and weather-indexed insurance. Crop insurance is an income stabilization mechanism, not a price stabilization scheme per se. Crop insurance comes in various forms—such as weather-indexed insurance, insurance against crop

[15] The evolutionary path was not smooth though. The organization of commodity exchanges was held responsible for every inflationary and deflationary spiral, which led to two congressional investigations, in 1947 and 1948 (Baer and Saxon 1949).

failure, and insurance against natural calamities and drought—and can be either a market-based or a non-market-based mechanism, depending on how a particular program operates. It can be termed market-based if it is self-sustaining with farmers buying the contract at a market-determined premium. On the other hand, it is a non-market-based mechanism if premiums are subsidized or paid either by governments or by their development partners. Two questions are pertinent in this regard: Can crop insurance markets be feasible and self-sustaining in developing countries? And if they need to be subsidized, what justifies the subsidies? Hazell et al. (1986) deal with these questions extensively. Their answer to the first question was that, even in developed countries, crop insurance was not fully sustainable and involved large subsidies. Referring to developing countries, they wrote:

> ...the costs of multiple risk crop insurance tend to be particularly high in developing countries. Large numbers of small farmers and wide diversity of agricultural practices greatly adds to administration and inspection costs. Poor data on actuarial risks and a lack of skilled personnel also hamper the writing and enforcement of contracts (Hazell et al. 1986, 295).

Despite these bottlenecks, a general answer to the second question is that subsidizing such a scheme can be justified at an early stage of development based on the argument of market failures. In the early 1980s there was growing interest in crop insurance in developing countries in Asia and Latin America, as well as a push from international organizations like the Food and Agriculture Organization of the United Nations (FAO), the United Nations Commission on Trade and Development (UNCTAD), and the Inter-American Institute for Cooperation on Agriculture, but very few countries (only Brazil, Costa Rica, and Mexico until the late 1980s) experimented with the policy.

Experiences with Various Policies

Food price stabilization programs in developing countries have been largely non-market-based—that is, they are implemented through direct government interventions. The most widely discussed and debated options are dual pricing policies, adopted by many Asian countries during the Green Revolution, and marketing board–led price controls in centrally planned economies. On the other hand, although they have been in existence for more than a century, market-based risk management instruments (such as warehouse receipts or commodity exchanges) have been introduced only recently in developing countries. For the sake of brevity, this section provides only brief reviews of experiences with dual pricing policies in Asia and recent initiatives instituting agricultural commodity exchanges.[16]

Experiences with dual pricing policies. Most Asian countries embarked on agricultural price stabilization programs in the 1960s. Although implementation approaches varied, the economic realities and the underlying policy justifications were similar across countries. All the sources of price instability described in the "Background" section were significant: agriculture was largely weather dependent, infrastructure was inadequate, risk management institutions were virtually nonexistent, and most countries were food deficient and hence food aid dependent. Therefore, policy thinking in all countries converged toward promoting agriculture to attain food self-sufficiency and improving agricultural markets. With the fortunate appearance of Green Revolution technology, policy makers became convinced that the objectives were achievable with appropriate government interventions that could mitigate the risks and uncertainties of new technology.

Dual pricing policies (ensuring floor and ceiling prices) were an outcome of that thinking. The main goals were to increase production, scale up social safety net programs, and maintain buffer stocks to ensure national food security. Alongside these efforts, governments also made investments to improve input supply, credit facilities, and rural infrastructure. The initial successes of these policies were remarkable in terms of increasing production, strengthening social safety net programs, and fueling overall growth (Rashid et al. 2005; Cummings et al. 2006).

Experiences over the years have varied, however, as some countries continued with the policies despite changes in the rationales that justify such interventions. Based on findings from six Asian countries (Bangladesh, India, Indonesia, Pakistan, Philippines, and Vietnam), a recent study concludes that the broad rationales for public intervention in these countries have changed over the years, although some countries continue to implement price stabilization policies more or less the same

[16] For a review of experiences with marketing boards in Africa, see Bates (1981).

way as they did in the 1960s.[17] The study shows that domestic markets are now well integrated, farmers have adopted new technologies, world cereal markets have matured, and all countries have adequate foreign currency reserves to participate in world markets at times of scarcity. The study further finds that although continued parastatal-led price policies have resulted in staggering increases in costs, liberalization has had beneficial impacts on the countries (Bangladesh and Vietnam) that pursued reforms.

Thus, the central message from the Asian experiences is that policy contexts are dynamic and policies need to be adjusted as contexts change. Many Asian countries failed to do so, which resulted in staggering amounts of subsidies and a distorted incentive structure for agriculture.

Experiences with agricultural commodity exchanges. The use of market-based instruments began only recently in developing countries. With the exception of pilot initiatives for weather index–based insurance and warehouse receipts, the focus has been mainly on setting up commodity exchanges. Although commodity exchanges have been in existence for more than a century, the recent interest in setting them up in developing countries is triggered by (1) the need for alternatives in the wake of market liberalization and (2) the enhanced availability and affordability of information and communication technologies. In many countries, governments historically played key roles in providing market information, facilitating trade, and setting prices. With liberalization, there was a vacuum in these services, and many countries felt a need for price discovery and an efficient trading mechanism—needs that can ideally be met by commodity exchanges. As a result, commodity exchanges have grown rapidly across the developing world over the past decade.

A recent UNCTAD review, however, suggests that experiences have been mixed. The key message from this review is that although the Asia-Pacific region, led by China and India, has succeeded in promoting commodity exchanges, Africa fared less well. In particular, except for South Africa, commodity exchanges either failed or had limited success in other countries in the region. This outcome is clearly discouraging for African countries, where both yield variability and price variability are among the highest in the world. This finding has two important implications. First, the failure of market-based instruments will give governments a reason to reverse policies and return to those that are detrimental to market development and agricultural growth. Second, since such instruments succeeded in countries with higher levels of development (Brazil, China, India, and South Africa) and failed in others, it may be that a majority of developing countries are not ready to rely on commodity exchanges, or other market-based instruments, for managing price instability.

This suggests that some form of non-market-based mechanism might be necessary before these countries can rely on market-based options for food price risk mitigation. The question is, how? Historically, public interventions have had problems related to excessive control, which induces inefficiencies, and the capture of policies by special interests over time. Now development practitioners have almost half a century of experience to help them refine policies and design government interventions in supportive and market-friendly ways. Two considerations are worth noting in this context: (1) leveling the playing field for both the private and public sectors and (2) stabilizing prices within a broad band, not at fixed levels.

Leveling the playing field essentially means not empowering government agencies with regulatory supports, such as monopoly control, movement restrictions, and preferential access to credit. On the other hand, stabilizing prices within a band implies moving away from fixed pan-territorial and pan-seasonal pricing, which most countries have practiced, toward seasonally adjusted pricing. The problem with fixed pricing is that it can be dictated by special interests. For instance, in India the floor price is set at the full cost of production, which includes the opportunity costs of labor, land, and equipment. As a result, over the years floor prices have gone up so much that floor prices in some months are higher than market prices. This outcome clearly contradicts the very logic for the government's intervention, which is meant to protect farmers from extreme price swings, not to guarantee profits. If floor prices were set at the variable costs of production, the band would have been larger, selling to government would not have been so lucrative, and the private sector could have participated in the market.

[17] See Rashid et al. (2005) for details.

Assignment

Your assignment is to consider a low-income, landlocked country in Africa with poor infrastructure and to recommend a set of policies to the government that would ensure an acceptable level of price stability for agricultural commodities. For decades, the country controlled agricultural prices through its marketing boards, which heavily distorted agricultural production incentives. Beginning in 1999 the country started dismantling its marketing boards and liberalizing agricultural markets. With liberalization, however, prices have become more volatile, and there has been increasing pressure on the government to undertake stabilization policies.

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Table I: A Synopsis of Options for Food Price Stabilization

Policy options	Implementation approach	Viability conditions and country experiences	Challenges / downsides
Non-market-based options			
Dual pricing	Enforce floor and ceiling price; maintain buffer stocks; support SSNs; open market sales in case of price spikes.	Requires highly disaggregated info system on prices (domestic and world) and costs of production; well-designed SSNs; supplementary regulations. Worked well in the early years of Green Revolution in Asia.	It is expensive and likely to be dictated by special interests. If practiced for prolonged periods, it impedes growth of private sector.
Strategic food security reserves	Maintain food reserves to manage emergencies; no formal enforcement of floor and ceiling price.	Requires management and analytical capacity in the implementing agency; efficient stock management; timely and market-friendly distribution and procurement.	Difficult to manage; high costs of operation; can destabilize markets. If the size is large, it can crowd out private storage and limit arbitrage.
Variable levies	Adjust import tariffs / export tax depending on domestic production and market conditions.	Requires good market intelligence on both domestic and world markets; capacity of the relevant authority to make quick decision and enforcements.	Can potentially be dictated by special interests; if governance is weak, lobbyists can influence the tariff decisions; does not work if a country is poorly linked with world or regional markets.
Subsidizing private storage	Public-private partnership; private sector uses public storage at subsidized price.	Requires limited availability of private storage and existence of large private stock from either individual traders or farmers' organizations; rule-based management to prevent traders / officials from colluding.	There is significant rent=seeking potential if government officials and private agents collude; can be politically unacceptable.
Market-based options			
Warehouse receipts	Farmers, traders, or processors take grain to a warehouse and get receipts, which are then used as collateral for borrowing from bank.	Requires grades and standards; strong legal environment for contract enforcement; well-functioning credit and insurance markets; volume of storage. Works well in combination with commodity exchanges.	Appropriate regulatory, legal, and business environment must be built; well-functioning credit and insurance markets needed. Potential for moral hazard, rent seeking.
Commodity exchange and futures markets	Sellers and buyers commit to future exchanges of grain for cash. For example, a farmer can agree with a trader on a price to deliver to him 500 tons of maize at the end of a predefined time period. If the bargain suits both parties, the farmer knows the exact price and the trader knows his costs and benefits.	Requires an enabling legal and regulatory environment; strong financial sector; functioning credit and insurance markets; systems of grades and standards; sizable domestic markets.	The biggest challenges for most African countries are lack of an enabling environment and small market size (trade volume).
Weather-indexed insurance	It is not a price stabilization instrument per se but can mitigate the price spikes and weather-related income shocks. Insurance policies are sold (or subsidized by the government or donors) to farmers. If the index falls below certain level, farmers are paid for the crop loss.	Requires strong legal and financial institutions; disaggregated rainfall data to create weather index.	Requires strong analytical and forecasting capacity. Formulating payout amount can be complicated by agroclimatic conditions. Potential for moral hazard.

International futures market	Developing countries use international futures markets to manage risks.	Requires participation of large farmers, traders, or intermediaries (such as farmers' organizations); or direct participation of the government. Has proved successful in some countries, such as for cocoa in Ghana and coffee in Guatemala.	Requires significant training and capacity strengthening of participating groups, including the government officials in the executing agencies.

Source: Compiled from various sources.

Chapter Nine
Rural Road Investments, Agricultural Development, and Poverty Alleviation in China (6-9)

by Satoru Shimokawa

Executive Summary

Beginning in late 1978, China adopted a series of policy and institutional reforms and achieved rapid economic growth and poverty reduction. National gross domestic product (GDP) grew at more than 9 percent a year from 1978 to 2005, and per capita income increased by 8 percent a year. The level and speed of economic growth and poverty reduction are diverse across regions, however, and income inequality has worsened between the coastal and inland regions, as well as between urban and rural areas. Although a number of factors have contributed to this widening regional disparity in China, differences in the stock and quality of transportation infrastructure have been among the key factors.

When the reforms began in 1978, China's transportation infrastructure was relatively poor compared with that in other countries with a similar level of per capita GDP, like India. Following rapid economic growth during the reform period, the demand for road transport skyrocketed, and transportation shortages and urban congestion became serious problems. The government started increasing its road investments in 1985 and further prioritized road investments in the 1990s. In particular, the government focused on the construction of high-grade roads connecting major cities in the coastal region (such as highways and expressways). With these investments, road density in China increased from 93.1 kilometers per thousand square kilometers in 1979 to 189.2 kilometers per thousand square kilometers in 2002 (National Bureau of Statistics of China 2003).

Although the government initially allocated more resources to the coastal region, it has recently started allocating more resources to the inland region, making road projects an important part of the development strategy for that region. The government still emphasizes projects for high-grade roads, however, rather than low-grade and rural roads.

In the wake of the rapid economic growth and poverty reduction stimulated by policy and institutional reforms, China now faces a new phase of economic development. The government must adapt its policies and institutions to new socioeconomic circumstances, such as increased regional inequality, decentralization of governance, and past investments in high-grade roads.

Your assignment is to advise the Chinese government on a long-term plan that will address rural road development for facilitating agricultural and rural development and poverty alleviation.

Background

Rural Infrastructure, Agricultural Development, and Poverty Alleviation

The importance of good rural infrastructure for agricultural development is widely recognized.[1] Several studies have examined the effects of infrastructure on agricultural development and demonstrated that investment in infrastructure is essential to increase farmers' access to input and output markets, to stimulate the rural nonfarm economy and revitalize rural towns, to increase consumer demand in rural areas, and to facilitate the integration of less-favored rural areas into national and international economies (see, for example, Antle 1984; Binswanger et al. 1993; Fan et al. 2000; Mundlak et al. 2002; Fan et al. 2002; and Fan and Zhang 2004).

[1] Pinstrup-Andersen and Shimokawa (2007) provide further discussion and more detailed empirical evidence for the relationships among rural infrastructure, agricultural development, economic development, and poverty alleviation.

These effects are important drivers of economic growth and poverty reduction both within and outside agricultural sectors. For example, in a recent comprehensive analysis of the impact of rural roads in Bangladesh, Khandker et al. (2006) found significant poverty reduction (5–6 percent) brought about through increased agricultural production, higher wages, lower transportation costs, and higher output prices. Investments in rural roads also led to increased schooling, and the authors conclude that poor people gained proportionally more than the nonpoor. Fan et al. (2002) document the critical role of infrastructure development—particularly roads and telecommunications—in reducing rural poverty in China between 1978 and 1997. The authors also show that poverty fell because of the growth in rural nonfarm employment that followed the expansion of infrastructure. Infrastructure investments along with appropriate institutions can reduce rural poverty in a variety of ways.

In addition, the quality of infrastructure is an important determinant of the effects of infrastructure on agricultural growth and poverty reduction. Fan and Chan-Kang (2005) show that, when measured by kilometer of new road, investments in high-grade roads in China produce returns to total GDP that are nearly 50 percent higher than returns from investments in low-grade roads. Investments in low-grade roads, however, have the largest returns in total GDP (41.5 percent higher) in rural areas, whereas the effects of high-grade roads were almost twice as high as those of low-grade roads in urban areas. Examining the economic rate of return per yuan taking the cost of construction into account reveals that high-grade roads have a lower rate of return per yuan than low-grade roads in all areas and regions. Similarly, Fan et al. (2004) demonstrate that investments in low-grade roads in Uganda (that is, feeder roads) reduced the number of poor Ugandans by more than three times as much as investments in more costly high-grade roads (that is, murram or tarmac roads).

China's Policy Reforms, 1949–Present

The People's Republic of China was established in 1949. During 1949–1978 the Communist Party employed the Soviet economic model of communism and centrally controlled all political and economic activities in China. In particular, the party emphasized a heavy industrial base, state ownership of the means of production in urban areas, collectively owned large units in agriculture, and centralized economic planning (Fan and Chan-Kang 2005).

In late 1978 the Chinese government began reforming the country's economic system. The reform has been implemented gradually and can be divided into three phases. During 1978–1984 the government initially focused on reforming the rural sector. Its main goal was to improve the standard of living in rural areas by increasing agricultural production and productivity and diversifying the rural economy. In the agricultural sector, the government broke up collective farming units and introduced individual farming under the household responsibility system. In the industrial sector, the government established township and village enterprises (TVEs)[2] and allowed individual enterprise. It also started relaxing the restrictions on international trade and foreign direct investment (Fan and Chan-Kang 2005).

During 1984–1991 the government extended reforms to the urban sector (that is, industrial enterprises). It began emphasizing market systems rather than central planning. During this period the government introduced the dual-track pricing system for industrial goods[3] and the enterprise contract responsibility system.[4] It also aimed to increase competition in markets by allowing private and foreign enterprises to compete with state-owned enterprises (SOEs). Other important reforms were the dissolution of the People's Bank of China, the introduction of an enterprise tax system, and an expansion of special economic zones. At the same time, the government introduced the first important poverty reduction programs, such as funds for public works in poor counties, which aimed at increasing the incomes of the poor and stimulating local economic growth (Fan and Chan-Kang 2005).

In 1992 Deng Xiaopeng asserted that China's reform toward the market economy would have to continue, and it was the first time that China officially supported the market economy instead of the

[2] TVEs are industries owned by townships and villages.

[3] Under dual-track pricing, some goods and services were allocated at state-controlled prices and others were allocated at market prices. Prices were gradually deregulated as markets were allowed to play an increasing role in setting them (Fan and Chan-Kang 2005).

[4] The enterprise contract responsibility system granted greater autonomy to enterprises to make production and employment decisions.

socialist economic system. Since 1992 the government has further liberalized domestic markets to achieve more efficient resource allocation, although it continues to wield significant power in the economy. In late 2001 China joined the World Trade Organization (WTO), giving an important signal that it will continue its reforms toward a market-driven economy. At the same time, according to Fan and Chan-Kang (2005, 10), the government launched "an ambitious poverty alleviation plan aimed at eradicating poverty by the end of the 20th century in the mid-1990s. Some key features of the program included subsidized loans, food-for-work infrastructure schemes, and various grants, which were targeted to 592 nationally designated poor counties." The government also supported agriculture directly by providing low-interest loans.

Overall, China experienced rapid economic growth of more than 9 percent a year during 1978–2005. During the same period per capita GDP in China increased from $673 to $5,878 in constant 2000 international dollars[5] (World Bank 2006). China has also successfully reduced poverty during the reform period. Based on China's official poverty line of US$0.66 per day (in constant 1985 purchasing power parity [PPP] dollars[6]), the number of rural poor decreased dramatically from 250 million in 1978 to 29.3 million in 2001 (Fan and Chan-Kang 2005). In addition, according to the World Bank, the poverty headcount ratio at $1 a day (in 1985 purchasing power parity dollars) fell from 28 percent in 1987 to 17 percent in 2001.

Lastly, it is worth noting that the agricultural sector remains an important component of China's economy, although its GDP share decreased from 31 percent in 1979 to 13 percent in 2004. Nonetheless, the agricultural sector provided 44 percent of total employment in 2002 (World Bank 2006). If other agriculture-related sectors are included (such as delivering and processing), the contribution of the agricultural sector to employment is much larger.

[5] The constant 2000 international dollar is the U.S. dollar converted at purchasing power parity exchange rates in 2000 that equalize the purchasing power of the U.S. dollar in the United States with that of local currencies in their home countries.

[6] The constant 1985 purchasing power parity dollar is a hypothetical unit of currency that has the same purchasing power that the U.S. dollar had in the United States in 1985. It shows a unit value of a local currency within its home country.

China's Road Development Policies

Before the reform period, China's national development strategy put little emphasis on road development (World Bank 1999).[7] Although the Chinese government started increasing investments in road development in the early years of the reform period, the investments had low priority compared with those in the industrial sector (Démurger 1999). Consequently, when the reforms began in 1978, road infrastructure in China was relatively poor compared with other countries like India. Road density was only 97 kilometers per thousand square kilometers in China in 1980, compared with 230 kilometers per thousand square kilometers in India (Fan and Chan-Kang 2005).[8]

In the early 1980s transportation shortages and urban congestion became increasingly serious problems owing to growing interregional trade combined with the insufficient investments in transportation infrastructure (Démurger 2001). Consequently, the government has increased its investment in roads since 1985, emphasizing in particular investments in high-grade roads connecting major cities in the coastal areas.

In the 1990s the government made investments in transportation infrastructure a higher priority. In particular, the government focused on constructing road networks connecting counties and towns and improving road quality. More emphasis has been placed at the national level on the construction of high-grade roads (expressways and class 1 and class 2 roads). Although the government initially allocated more resources to the coastal regions, it has recently started allocating more resources to the western region, making road projects an important part of the development strategy for that region. According to Fan and Chan-Kang (2005, 21), "the growing disparity in road provision across regions led the central government to launch major road construction projects in the central and western regions. As a result, the share of highway

[7] This subsection describes government policies for road development in China based on the information in Fan and Chan-Kang (2005). For more details, please refer to that paper.

[8] Please note that official Chinese statistics may have understated the length of rural roads in China because most rural roads are not included in China's road statistics. Benziger (1993) adjusted the official statistics of road density based on information from Hebei Province and found that China's road density in the 1980s was only 20–30 percent below India's.

investment in eastern China declined from 54.8 percent in 1998 to 45.2 percent in 2001, whereas the corresponding shares in central and western China increased from 45.1 percent to 54.9 percent."

Following these policy reforms, road density in China increased from 93.1 kilometers per thousand square kilometers in 1979 to 189.2 kilometers per thousand square kilometers in 2002. Also during 1980–2002, the share of high-grade roads in total road length increased from 1.4 percent to 14.1 percent, whereas the share of low-grade roads (class 3, class 4, and substandard roads) decreased from 98.6 percent to 85.9 percent. In particular, the decrease in the share of class 4 and substandard roads was significant, from 85 percent to 68 percent (National Bureau of Statistics of China 2003).

Policy Issues

Regional Inequality in Economic Development and Road Infrastructure

Although the whole economy of China has grown rapidly during the past few decades, economic development has been uneven across regions. China's coastal regions tended to develop faster than the inland regions, even before the policy reforms. The introduction of economic reforms (such as special economic zones along the coast) further intensified the economic gap between the coastal and inland regions. In 2002 average GDP per capita was 40,646 yuan in Shanghai and only 3,153 yuan in Guizhou—less than one-tenth of that in Shanghai. In addition, the shares of agriculture in total GDP tend to be much higher in inland provinces than in coastal provinces, showing that farming is still a major source of rural income in inland China. Moreover, per capita annual income was 2,476 yuan and 7,702 yuan in rural and urban areas in 2002, respectively. Because price levels and lifestyles differ significantly between urban and rural areas, the gap between these figures does not directly represent a gap in living standards between rural and urban areas. Yet these figures still imply a significant gap between these areas (National Bureau of Statistics of China 2003).

Naturally, the incidence of poverty is also unevenly distributed in China and most prevalent in inland rural areas with poor agricultural land and weak infrastructure. Based on the estimates in Chen and Wang (2001), the 1996 headcount poverty rate at $1 PPP was 24.8 percent in rural areas and 0.4 percent in urban areas. With respect to rural poverty, in 1996 the headcount poverty rate at $1 PPP among the rural population was 50.9 percent in Gansu and 0.8 percent in Shanghai. Moreover, because the incidence of rural poverty decreased much more slowly in the inland regions than in the other regions, the incidence of rural poverty has become increasingly concentrated in the inland regions.

The density and quality of road infrastructure also vary widely across regions in China. The western region is poorly served by roads compared with the central and coastal regions. According to Fan and Chan-Kang (2005, 19), "in 2002, there were only 166 and 66 kilometers of roads for every thousand square kilometers of land in southwest and northwest China, respectively, compared to more than 460 kilometers per thousand square kilometers of land in the eastern and central regions. Road quality is also the worst in the western region. In southwest China, for example, high-quality roads (expressways and class 1 and class 2 roads) account for less than 6 percent of the road network compared to 20 percent in the northern and the eastern regions." Road infrastructure is also unevenly allocated between rural and urban areas. In rural China about 184 towns and 54,000 villages, most of which are located in the western region, had no access to roads in 2003 (Xinhua News Agency 2003).

The growing socioeconomic inequality and the increasing concentration of poverty in the inland regions may cause social instability. Thus, since the late 1990s the Chinese government has initiated several projects aimed at reducing poverty and regional inequality in China. For example, the government has proposed improving infrastructure; intensifying environmental protection; and developing science, technology, and education in inland rural areas.

Social and Economic Returns to Investment in Rural Roads

Because available resources are limited, the government should select the projects that contribute most to social welfare. That is, the selected project should yield the largest gains in social welfare among available policy options. In the context of this case, there are two key questions: (1) How profitable are investments in rural roads in China? (2) Are there more cost-effective ways to promote agricultural development and poverty reduction?

The answers to these questions depend on whether profitability is measured in terms of private or public benefits and whether externalities are considered. Returns to investments in transportation infrastructure are much broader than just the decrease in transport costs. Investments in transportation infrastructure also benefit society by widening markets, increasing competition in markets, and enabling dissemination of knowledge and technology. Because of these characteristics of infrastructure investments, relying on the private sector is likely to result in underinvestment. Even the public sector may not adequately invest in infrastructure if it fails to consider the external effects of infrastructure.

For the first question, although there is some evidence of high rates of return to infrastructure investments in general (see, for example, World Bank 1994, 2003),[9] few estimates have been made of the rate of return to investments in rural infrastructure. Table 1 presents the estimated marginal returns from investments in rural infrastructure in selected developing countries. In these studies, the contributions of rural infrastructure are measured by the impact on aggregate output of an economy. All estimates are significantly higher than one, which implies that one currency unit of investment induces more than one currency unit of return, and thus investments are profitable. Investments in roads and telephone lines in particular have high returns.

For the second question, to the best of our knowledge, no existing studies provide a direct answer. The findings in Canning and Bennathan (2000), however, provide some indications of the relative profitability of investments in rural infrastructure. They estimate the rate of return to electricity-generating capacity and to paved roads at the national level for 51 and 41 countries over the past four decades, respectively. They find that investments in electricity-generating capacity and paved roads are more profitable than other public investments in 20 out of 51 countries and in 22 out of 41 countries, respectively. Although the rate of return to electricity-generating capacity tends to be high in low-income countries, that to paved roads tends to be high in middle-income countries. Unfortunately, these findings are not specifically for investments in rural infrastructure.

Types of Roads for Agricultural Development and Poverty Alleviation

Another important question concerns what types of roads are most effective for agricultural development and poverty reduction. The Chinese government historically emphasized the construction of high-grade roads during the reform period. Fan and Chan-Kang (2005), however, argue that investments in high-grade roads are not always economically superior to those in low-grade roads, largely because constructing high-grade roads costs much more than constructing low-grade roads. On average, about 8.5 kilometers of low-grade roads can be constructed using the same amount of money it costs to build 1 kilometer of high-grade roads.

Fan and Chan-Kang (2005) demonstrate that low-grade roads may have much greater benefit-cost ratios for national GDP than high-grade roads. Also, high-grade roads do not have a statistically significant impact on agricultural GDP whereas low-grade roads are not only significant, but also generate 1.57 yuan of agricultural GDP for every yuan invested. Moreover, investment in low-grade roads generates high returns in rural nonfarm GDP.

Taking these findings into consideration, the government must determine the allocation of investments between high-grade and low-grade roads depending on its policy priority. If the government prioritizes rural development and poverty reduction, investments in low-grade roads may be more cost-effective than those in high-grade roads.

Financing Rural Road Projects

Following the economic reforms, the sources of funds for road projects have become increasingly diverse. There are not only funds from the central and local governments, but also loans from international organizations, the domestic private sector, and foreign capital. Another important financial source for infrastructure projects is long-term public bonds introduced in the late 1990s.

[9] The Operations Evaluation Department of the World Bank (2003) reported a higher economic rate of return for road projects (for example, 40 percent in Bangladesh during 1996–2003 and 460 percent in Togo during 1997–2003) than for energy projects (for example, 17 percent in Uganda during 1991–2002 and 21 percent in Lithuania during 1994–2003). The World Bank (1994) also reports that the average economic rate of return for World Bank projects evaluated over the period 1983–1992 was 11 percent for electricity projects and 29 percent for road building.

Table 1: Marginal Returns on Investment in Rural Infrastructure in Developing Countries

Country	Year	Source	Measure of Returns	Infrastructure Indicator	Effect
China	1997	Fan, Zhang, and Zhang (2002)	Rural GDP	Investment in irrigation (yuan)	1.88
				Investment in roads (yuan)	8.83
				Investment in electricity (yuan)	1.26
				Investment in telephone (yuan)	6.98
Uganda	1992–1999	Fan, Zhang, and Rao (2004)	Total GDP	Investments in feeder roads (shilling)	7.16
Tanzania	2000–2001	Fan, Nyange, and Rao (2005)	Total Output	Investments in roads (shilling)	9.13
China	1982–1999	Fan and Chan-Kang (2005)	Total GDP	Investment in high-quality roads (yuan)	1.45
				Investment in low-quality roads (yuan)	6.37

Source: Data sources are listed in the third column.

It is also worth noting that the decentralization over the reform period in China contributed to widening regional inequality in infrastructure. Although decentralization has given greater autonomy to local governments, local government revenue (based on local economic activity) and the quality of human capital are diverse across local governments. Thus, the capacity to finance infrastructure projects is also diverse across local governments (Démurger 1999).

The Capacity for Good Governance

Although the responsibilities of local governments have increased under recent decentralization, the capacity for good governance is still much lower among local governments compared with the central government. Thus, it is necessary to increase their capacity for good governance to effectively implement policies, reform institutions, and prevent corruption.

Stakeholders

There are six main groups of stakeholders related to rural road development in China: the central government, local governments, the domestic private sector, farmers and nonagricultural sectors in rural areas, urban communities, and foreign capital.

The Central Government

In the long run, investments in rural road development would contribute to improving the economic capacity of rural areas, and thus that of the whole Chinese economy. The investments would intensify rural economic development and poverty reduction. Investments in rural roads also improve human capital by increasing the access to school and health care. These improvements would contribute to increasing tax revenue over time and social welfare at the national level.

At the same time, the government must take short-run benefits into account to sustain current economic growth and finance long-run projects. For example, investments in high-grade roads in the coastal region may yield higher profits in a shorter period compared with investments in rural roads in the inland region, although the investments in rural roads have larger effects on agricultural development and poverty reduction.

Another important interest for the central government is to reduce inequality in socioeconomic status across regions. Although greater autonomy

has been given to local governments through recent decentralization, the central government is still responsible for harmonizing local policies and reducing regional inequality at the national level.

Local Governments

The interests of local governments are similar to those of the central government. A key difference is that local governments are principally interested only in their local areas—for example, local tax revenue and the development of the local economy. Thus, local governments may have little interest in, for example, reducing socioeconomic inequality at the national level.

In addition, the relationship with the central government is crucial for local governments to obtain enough support from the central government. This aspect tends to be more important for poorer local governments, which are mostly in the inland region.

The Domestic Private Sector

Rural road development is mainly related to two subsectors of the private sector: the construction industry and financial institutions. The size of road projects (that is, the budget size) may be a primary interest for construction firms. In many cases, construction firms will be more interested in larger projects (like expressways) that will provide larger returns and longer contract terms.

For financial institutions, the profitability of road investments is a key interest. The private financial has considered investments in infrastructure less profitable than investments in industries and thus avoided them. In addition, during the 1980s the government controlled the money supply and implemented a tight credit policy to slow down overheated infrastructure investments (Démurger 1999). Although the private financial sector has recently increased investments in expressways in the coastal region, it accounts for a small part of investments in rural road projects.

Rural Communities: Farmers and Nonagricultural Sectors in Rural Areas

High transportation costs to reach markets and education and health facilities are one of the key obstacles preventing the poor in rural areas from escaping from poverty. Improving access to economic centers, schools, and health services are main interests for farmers and nonagricultural sectors in rural areas. In addition, better access to new technology and technical support is crucial for farmers. On the other hand, rural people are also concerned about additional tax burdens stemming from infrastructure projects.

Urban Communities

Because the government has limited resources, emphasizing rural road development is likely to induce resource reallocation from urban to rural areas and may slow down urban road development. On the other hand, lowering transportation costs between urban and rural areas may provide cheaper rural products to urban communities and increase demand for urban products in rural areas.

Foreign Capital

International organizations like the World Bank are a main source of foreign capital for rural road development in China. During 1990–2005 the World Bank launched 108 toll road projects (9 projects were canceled) in China in collaboration with domestic and foreign private sectors. The total investments in road projects during this period reached US$15.4 billion. Although recent projects have focused on improving road infrastructure in the inland region, most projects are for the construction, rehabilitation, and operation of highways and bridges rather than for low-grade roads (World Bank 2007).

Policy Options

The Chinese government has implemented a series of policy and institutional reforms and invested a significant amount of money in the development of roads and other key infrastructure. As a result, China realized rapid economic growth and poverty reduction in recent decades. At the same time, entering a new phase of economic development, the government must adapt its policies and institutions to new socioeconomic circumstances. This section presents potential policy options for facilitating further agricultural and rural development and poverty reduction in China.

Invest in Low-Grade and Rural Roads

In the past, road investments in China have been heavily focused on high-grade road projects such as expressways and intercity highways. These investments have significantly improved transportation infrastructure in China. On the other hand, low-

grade and rural roads have received little attention. As more and more high-grade roads are constructed, the marginal returns of the investments in high-grade roads decline. As a result, the marginal returns to low-grade roads are much larger today than those to high-grade roads (Fan and Chan-Kang 2005). In addition, low-grade roads in rural areas will contribute more directly to improving the living standards of the poor in rural areas than do high-grade roads. That is, investments in low-grade and rural roads contribute to economic growth as well as poverty alleviation. Thus, the government should consider giving more priority to low-grade and rural roads in its future investment strategy.

Facilitate Private Sector Participation in Rural Road Projects

To sustain investments in rural roads and other key infrastructure and manage infrastructure services, the participation of the private sector in rural infrastructure projects is crucial. The Chinese government should make further efforts to create an enabling environment for a well-functioning capital market in rural areas. It is also important to recognize the role of government in facilitating private transactions. A number of public interventions such as standardization, grading, enforcement of contracts, and regulations to stimulate effective competition are needed to make private markets work.

Subsidize Road Development in Inland Rural Areas

As a result of decentralization, the share of local government in infrastructure investments has increased. On average, local government accounted for about 80 percent of public investments in road projects in 2002 (Fan and Chan-Kang 2005). Because budgets for these projects depend critically on local government revenue, which depends on local economic activities, decentralization increased a regional gap in the capacity to finance road projects. Although inadequate road infrastructure is more serious in the inland region than in the coastal region, local governments in the inland region tend to have much smaller capacity to finance road projects than those in the coastal region. To remedy this unbalanced situation, the central government may need to provide subsidies for rural road projects in the inland regions.

Invest in Market Institutions

To maximize the economic effects of rural road development, China needs to build and maintain proper market institutions that connect rural economies to major economic centers in the coastal region. Thus, in addition to rural road development, the Chinese government should consider investing in rural market institutions.

Pursue Other Policy Options for Facilitating Rural Development and Poverty Reduction

Rural road development is not the only way to facilitate rural development and poverty reduction. Other choices such as investments in agricultural research and technology, irrigation, electricity, educational facilities, and health care facilities are also important. Thus, the government should compare the costs and benefits of rural road development with those of other options.

Increase the Capacity for Good Governance

To implement the options described and use available resources more effectively, improving local governance is essential. In particular, China needs to improve supervision, monitoring, and evaluation methods through the transparent disclosure of project information and cross-functional teamwork. To reduce the risk of corruption, improvements in procurement and financial management will be important. For example, external firms could conduct specialized procurement audits to review procurement contracts for compliance with donors' guidelines.

Assignment

Your assignment is to advise the Chinese government on a long-term plan that will address rural road development for facilitating agricultural and rural development and poverty alleviation.

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Chapter Ten
The Growing Trend of Farmers' Markets in the United States (6-10)
by Erica Phillips

Executive Summary

Farmers' markets have surged in popularity in the United States during the past 30 years. Since the U.S. Department of Agriculture (USDA) began collecting information on farmers' markets in 1994, the number of markets increased from 1,755 to more than 4,385 in 2006 (USDA AMS 2007b). It is estimated that more than 3 million consumers shop at these markets, and about 30,000 small farmers and food entrepreneurs earn a partial or full living selling their local products at farmers' markets (PPS 2006).

Farmers' markets are launched and operate owing to a multitude of factors and objectives. Some open in response to demand from the production side, as farmers seek direct-to-consumer outlets for their produce. Other markets open as a result of consumer interest in the perceived benefits of locally grown produce. Finally, some farmers' markets are initiated with the broader goals of supporting the local economy, promoting community food security, revitalizing public spaces or downtown areas, addressing public health and nutritional concerns, or improving disadvantaged populations' access to fresh produce.

Whatever the impetus for starting a farmers' market, all markets have potential strengths and weaknesses. Policy decisions made at the federal, state, and local levels influence the success of farmers' markets. The policy framework within which these markets operate can have powerful impacts on how markets operate, who has access to shopping or selling at farmers' markets, and how well markets are coordinated and connected with each other. Because farmers' markets are located in numerous and diverse locations, they often reflect the interests of the communities in which they operate.

This diversity of farmers' markets, however, has also contributed to a lack of centralized or large-scale evaluation of markets. This dearth of information is reflected in scattered studies and poorly evaluated market impacts. Analyzing the effects of market operations and policy issues surrounding farmers' markets, such as economic, environmental, social, and health issues, can help policy makers understand potential policy options for improving and possibly expanding market growth.

Your assignment is to propose the establishment of a local food market from the perspective of a consultant to a community and to identify the most important policy issues for starting and operating farmers' markets, taking into account the diverse goals of various stakeholders.

Background

Global food systems have shifted dramatically in the past 50 years. Changes extend across the entire food system, from production, processing, distribution, marketing, access, and consumption to waste management. Some by-products of this changing food system are centralization and control by fewer and fewer large corporations across the entire food chain and greater geographic distance between producer and consumer. Some analysts argue that the most profound changes have occurred in the agribusiness marketing of farm products and that the most important players in the global food system today are retailers, who are now powerful enough to force processors and manufacturers to compete for market access (Barrientos and Dolan 2006).

Markets are the mechanism that connects producers and consumers in the food system. Since retailers are the most obvious market interface between producers and consumers, they have the capacity and often the power to define industry norms and standards and to influence consumer behavior. As retailers drive market changes, producers and consumers shift their choices and actions as well. Part of the growth in direct market sales and farmers' markets in the past 30 years stems from reactions to changes in America's food

systems, as some consumers and social groups blame the consolidation of power and streamlining of the food system for their displeasure with the food choices available in supermarkets or super stores. Others are seeking alternative means of selling or purchasing food, a means of communication, information and value exchange, an educational venue for improving nutrition in communities, an economic stimulus, and a way to revitalize downtown areas.

Why are farmers' markets so popular with producers and consumers alike? Growers' participation in farmers' markets depends on several factors, including a market's popularity, location, and management (Kremen et al. 2004). Previous studies show that consumers who patronize markets are seeking freshness, high-quality produce, fair pricing, pleasant social interactions, and locally grown foods (Lockeretz 1987; Brown 2002). Vendors at markets often provide heirloom and specialty varieties and handcrafted products, which are difficult to mass produce and are rarely found at other markets (Lyson et al. 1995). Customer participation is often determined by the location of the market, since most customers tend to shop where they live (Brown 2002).

Direct Marketing and the Locally Grown Movement

Direct marketing is a technique that cuts out an intermediate party to sell a product. Farmers' markets, roadside farm stands, and CSAs (community-supported agriculture programs) are examples of direct marketing schemes. Although some farmers find direct marketing a powerful tool, it is best suited for certain commodities, such as greenhouse crops, ornamentals, fruits, and vegetables, and thus it cannot be used by all producers. Because of added processing and health safety concerns, it is more difficult for dairy, grain, meat, and poultry producers to market their products directly to consumers.

The geographic component of the food people consume—that is, where food is grown and how far it must travel to reach one's kitchen—is rapidly gaining attention. In 2006, 36 cities and towns initiated "buy local" campaigns, promoting support for local farmers and independent businesses (MacDonald 2006). Buying "local food" can include purchasing goods marketed directly to the consumer from farmers' markets or farm stands and patronizing restaurants, institutions, and retailers that buy and re-sell locally produced food.

The History of Farmers' Markets

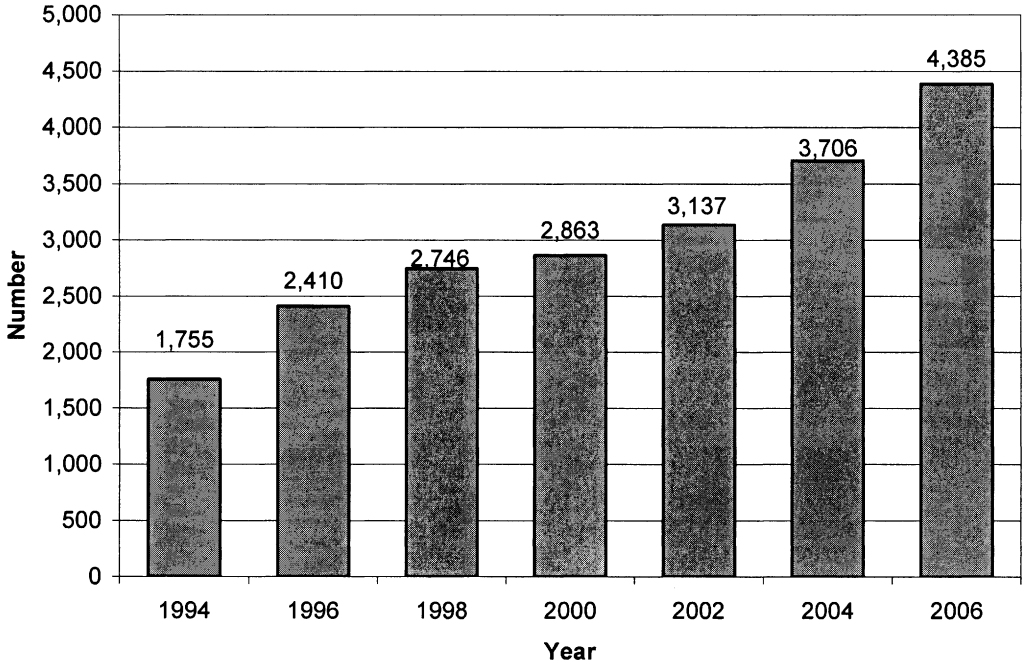
Farmers' markets have been in existence for centuries in North America. The first markets were the main way that urban residents could obtain fresh meat, dairy products, produce, and poultry. In the 1950s and 1960s urbanization and technological improvements like high-speed transportation, refrigeration, and irrigation infrastructure in the western United States led to increased food wholesaling (Brown 2001). These technological improvements, along with on-farm technological changes such as widespread use of chemical fertilizers and pesticides after World War II, increased economies of scale. Many small producers were forced out of the wholesaler-dominated marketplace as prices dropped and they could not meet wholesalers' volume demands.

In 1976 the U.S. Congress passed Public Law 94-463 (PL 94-463), the Farmer to Consumer Direct Marketing Act. This law legitimized direct consumer marketing by farmers by allowing government extension agents to work with farmers, local activists, and government officials to organize farmers' markets (Brown 2001). The years following the passage of this law saw the most rapid growth of farmers' markets in history. Throughout the 1990s and into the 21st century, the number of farmers' markets has continued to rise. In 1994, when the USDA began publishing the National Directory of Farmers Markets, there were 1,755 farmers' markets in the United States. By 2006 that number had jumped to 4,385[1] (USDA AMS 2007b).

As the number of markets continues to increase across the country, so do the number of federal, state, and local government agencies that support and promote this growth. At the federal level, the USDA has multiple programs that work to promote direct marketing efforts, including farmers' markets. The USDA's Agricultural Marketing Service (AMS) has formed the Farmers' Market Consortium and a Farmers' Market Promotion

[1] The USDA defines a farmers' market as a market that meets three criteria: (1) it has two or more venders, (2) 50 percent of produce is sold to consumers, and (3) annual gross market sales exceed US$1,000 (personal communication with the USDA Agricultural Marketing Service).

Figure 1: Number of Farmers' Markets in the United States, 1994–2006



Source: USDA AMS 2007b.

Program. The Farmers Market Consortium[2] is a public–private sector partnership that works to connect and train market growers, provides resources to market managers on what other markets are doing, educates consumers about markets, and updates federal policy makers on the needs of farmers' markets with data collected from surveys and other sources (PPS 2006; USDA AMS 2007a).

States are charged with administering and in some cases providing matching funds for certain federal nutrition programs such as the Women, Infants, and Children Farmers' Market Nutrition Program, the Senior Farmers' Market Nutrition Program, and the Food Stamp Program. Additionally, state-level policies can affect food safety and manufacturing rules, as well as coordination and promotion of agricultural products and direct marketing (Hamilton 2005). Because many markets are a "local" activity, it follows that many of the policy options and decisions are developed and coordinated at the local level. Local policy issues usually include logistical, operational, licensing, funding, and health and food safety concerns.

Different Kinds of Markets

Farmers' markets are defined as fixed locations where several farmers gather to sell their own products at recurring times. Farmers' markets often include local food vendors and craftspeople as well as different types of agricultural products, such as fruits, vegetables, dairy products, eggs, meat, fiber, and honey. Markets can be classified by different factors, such as their location or structure (open air markets, market halls, and market districts) or defined by what is sold at the market, such as "grower only," "green," or "organic." Some

[2] The consortium consists of several USDA agencies, the U.S. Department of Health and Human Services, the Ford Foundation, the Kellogg Foundation, the Project for Public Spaces, and several farmers' market nonprofit groups.

markets allow vendors to sell only what they have produced or raised on their farm, and others allow for buying and re-selling or processing of products.

Farmers' markets in the United States have grown concurrently with organic production. Although marketing channels for organic products have increased in the past decade, farmers' markets are generally an accessible, low-cost, and flexible sales outlet for many organic producers. Studies show that organic growers tend to use direct marketing outlets more than other farmers (Walz 1999 in Kremen et al. 2004). A 2002 USDA study of 210 farmers' markets across the country showed that organic growers participated in more than four-fifths of the selected markets and represented one-third of farmers who regularly participate in farmer's markets (Kremen et al. 2004). In 2002 the USDA implemented new organic regulatory standards that require farmers to adhere to strict rules for the methods, practices, and substances used in producing and handling crops. Although the federal government now sets standards for organic products, there are currently no standards for what is considered "locally produced." Locally produced can refer to a product grown in the same state or county or simply one grown by a producer who is closer to a consumer than another producer.

Three Farmers' Markets

To better explain the diverse reasons that farmers' markets open and operate, this section briefly describes three markets: the Ithaca Farmers' Market, the Oakland Medical Center Farmers' Market, and the Saturday Stockton Certified Farmers' Market, each with varying demographics and motivations for their opening. Consideration of the experiences of these markets, combined with the subsequent section on policy issues, will help explain the objectives of farmers' markets, the effects of policy on their operation, and the policy options for achieving the goals of various stakeholders.

The Ithaca Farmers' Market. The Ithaca Farmers' Market (IFM) is a 33-year-old cooperative comprising 165 vendors, all of whom live within a 30-mile radius of Ithaca, New York (IFM 2007). The market, which began in 1973 in the parking lot of a local hardware store, was started by local growers and craftspeople seeking an outlet for their goods. It has moved five times, going from a parking lot to an empty downtown lot to an old airport hangar, until relocating to Steamboat Landing, just off Cayuga Lake. The market is currently open four days a week, but the Saturday market, which is open from April through December, is the largest of these.

The market has become a popular weekend destination for community members and tourists. It has also become a center for entertainment, performances, recreation, and seasonal activities. This is an example of a market that attracts a large segment of the local community, some of whom come to support the farmers and the produce and some of whom are attracted by the entertainment value and community-building aspect of the market. According to its website, during the summer the Ithaca Farmer's Market often attracts more than 5,000 people a day. In 1999 total market sales neared US$4 million. Vendors typically consist of 50 percent agricultural vendors, 30 percent craft vendors, and 20 percent food vendors (personal communication with IFM manager). More than 90 percent of the farmers who participate in the IFM are small-scale farmers.

The demographic makeup of the locale partially explains the market's popularity. A number of surveys in Canada and the United States show that farmers' market patrons are often middle-aged, middle-income or above, and well-educated women (Cummings et al. 1999; Govindasamy et al. 1998). IFM is located in the city of Ithaca, which has a population of 30,343 and is home to two major universities, Cornell University and Ithaca College. According to the 2000 U.S. Census, 60 percent of the local population has a bachelor's degree or higher, compared with 25 percent for the general U.S. population. The median family income in the city of Ithaca is US$57,125, compared with $50,046 for the country (U.S. Census Bureau 2000, 2007). Although the market accepts food stamps through the Electronic Benefits Transfer Program, during the 2006 season only US$268 worth of food stamps were spent at the market through early December (personal communication with IFM manager).

Oakland Medical Center Farmers' Market. In contrast to the 33-year-old Ithaca market, the Oakland Medical Center Farmers' Market, held at the Kaiser Permanente Medical Center in Oakland, California, started in 2003. It is one of the first hospital-based farmers' markets and emphasizes fresh and organic produce. This market contains eight farm stands and a health education table and is part of a program that promotes healthy diets and weight

management for hospital staff (Maring 2004). The goal of this market is the eventual transfer and implementation of health and nutrition messages from the staff to the patients.

Although the idea of the hospital-based market was conceived by one of the doctors who worked in the hospital, the benefits of the market extend from the staff to patients, community members, and local farmers. In Northern California, there is a two- to three-year waiting list for farmers to secure a spot at some markets (Maring 2004). This market, like eight others located on Kaiser Permanente facilities, provides outlets for farmers to sell their produce and for nutritional education and access to produce for hospital employees and community members. Unlike New York State, California has a year-round growing season so this market allows staff members to shop while they work, reducing the amount of time that they would have to spend shopping and traveling to a grocery store.

Stockton Certified Farmers' Market. Even though California has many more large-scale farms than does the Northeast United States, farmers' markets provide an essential outlet for small scale "non-traditional" producers (Feenstra et al. 2003). The Saturday Stockton Certified Farmers' Market, located in California's Central Valley, is largely driven by the racial demographics of the area. According to the 1990 U.S. Census, the market is located in an area that is 34 percent Asian, mostly of Southeast Asian descent. Local demographics influence the mix of vendors at the market. During the early 1980s the market evolved to meet Southeast Asian consumer tastes and demands. Although the market's initial vendor mix was predominantly Caucasian, in 2001 it was composed of 90 percent Southeast Asian vendors, many of whom were recent immigrants to the United States (Lewis 2001). The makeup of the population influences not only what is sold at the market, but also who sells what at the market. Lao and Hmong peoples from landlocked areas in Southeast Asia generally sell vegetables, whereas Vietnamese immigrants from coastal areas tend to sell fish (Lewis 2001).

Incomes in the neighborhood surrounding the market are well below those of the rest of the county, explaining a large volume of food stamp and Farmers' Market Nutrition Program coupon sales (Lewis 2001). In the mid-1990s food stamp sales reached a high of about US$1 million a year at the market. Subsequent changes in the Welfare Reform Act of 1996 cut this number in half, but it still highlights the importance of the market to lower-income families who are able to buy fresh produce with government assistance. It also highlights the importance of these programs for the vendors, who could not survive without the large quantity of food stamps they receive each year. The market has provided employment for many first-generation immigrants, as many second-generation immigrants leave the farm for other careers (Lewis 2001). The market's "exotic" produce, strong immigrant affiliation, and size make it an important piece of the local economy and food system.

Policy Issues

Economic Issues

It is often argued that buying locally produced food supports local business and communities by re-circulating local dollars. In Tompkins County, New York, where Ithaca is located, it is estimated that if everyone spent 10 percent of their food dollars locally, the county would generate US$32 million in "local food dollars"[3] (CCE n.d.). Farmers' markets are often credited with having economic multiplier effects. Some markets have been shown to increase the number of jobs in and around the market, act as incubators for new businesses, strengthen and diversify regional agriculture, and increase farm profitability (Lyson et al. 1995). The economic impact of farmers' markets can be beneficial to a community, because market customers purchase not only from market vendors, but, depending on the setup of the market, from neighboring shops and stores as well. A study by Lev and Stephenson (1998) found that 63 percent and 38 percent of patrons at two farmers' markets in Oregon planned to do other errands in the area that day. They estimated that market visitors spent more than US$11,000 in each of the two communities on market days in addition to what they spent at the market.

A 2003 study by the USDA's Economic Research Service showed that small-scale businesses constituted 91 percent of all farms and ranches in the United States. They own 70 percent of total farm and ranch land and produce 27 percent of U.S. food and fiber (as cited in USDA CSREES 2006). For small-scale growers, farmers' markets present a

[3] "Local food dollars" simply refers to money spent on food in a community.

way for farmers to earn higher net incomes per acre and premium prices without having high capital costs or the prohibitive investment of a storefront operation (Gale 1997). Farmers' markets can be a way for producers to avoid selling produce to wholesalers, who might not offer premium prices and who have stringent volume and product requirements that can be difficult for small growers to meet. It is estimated that producers realize a 40–80 percent increase in returns on their products by marketing through farmers' markets compared with traditional brokers (Sanderson et al. 2005).

These figures do not include, however, the extra time and labor costs involved in packing, transporting, and selling the products at a farmers' market. A 1995 study shows that the majority of vendors (60 percent) who participated in farmers' markets reported a "modest" return, compared with 7 percent of vendors who reported a significant return (Hilchey et al. 1995).

Farmers' markets may also offer a business incubation function, allowing people to start a new business or alter an existing business without high start-up costs. A 1995 survey found that 86 percent of the vendors in nine markets across New York State did not have a business before they started selling at a farmers' market or they had a small operation at their residence (Hilchey et al. 1995). It is important to recognize, however, that there is often no measure or record of the drop-out rate of businesses participating in farmers' markets.

Trade advocates, who argue in favor of trade over local purchasing, consider another side of the economics of farmers' markets and "buy local" campaigns. Modern international trade theory is driven by the concept of comparative advantage, which says that each region should specialize in producing only what it can produce most cheaply and that all other products should be traded. This theory is often used to support trade liberalization, because many developing countries can produce goods more cheaply than can the developed counties owing to comparative advantages in labor and possibly climate. Critics point out, however, that comparative advantage does not take into account the environmental costs of trade, such as global climate change, or ethical questions of trade (like social justice or gender inequalities). But trade advocates argue that purchasing only locally produced products can undermine efficiency as well as poverty reduction efforts. They contend that promoting locally produced products "can breed an unhealthy provincialism," isolating and fragmenting communities in a globalizing world (John Clark as quoted in MacDonald 2006). Given that the share of agricultural products sold directly to U.S. consumers is less than 2 percent of total sales, this practice does not currently appear to have a strong influence on trade, but if consumers in developed countries continue to depend on local products, it could potentially limit trade possibilities for certain developing-country farmers.

A final economic consideration concerning farmers' markets is the time and energy required for consumers to shop at the market. Modern supermarkets are set up for one-stop shopping. A study conducted at three Tennessee farmers' markets found that more than half of the customers made a special trip to shop at the farmers' market rather than including it in a routine shopping trip (Brooker et al. 1993). Even the largest farmers' markets in the country do not supply all of the goods that customers seek. Traveling to a farmers' market can therefore be an extra stop in busy people's schedules.

Community Development Issues

Community goals of farmers' markets often include supporting farming communities, creating jobs or promoting entrepreneurship, revitalizing neighborhoods, improving health and nutrition, and creating an active public space. Farmers' markets are seen as a way to connect (or reconnect) farmers and consumers and to educate consumers about agricultural and health issues. Markets are able to meet the needs and desires of the population they sell to, reflecting the local identity. Many studies have revealed that the most important reasons why both farmers and consumers frequent farmers' markets are socially related, such as community building and bringing diverse groups of people together (Gale 1997; PPS 2006).

Farmers' markets have gained popularity at a time when the number of small farms in the country is declining. In the last agricultural census conducted in 2002, New York State had 37,255 farms, and that number has steadily decreased since 1960 (USDA NASS 2006). With farmland, and subsequently farmers, decreasing, it is unlikely that rural communities can survive unless they can be more profitable. In a 1999 study of three states in the United States, it was found that 56 percent of the enterprises in farmers' markets are small-scale

enterprises and that 86 percent of these vendors ranked farmers' markets as their most important opportunity for business development, showing the importance of markets to these select groups (Feenstra et al. 2003).

Nutrition and Food Safety Issues

Many farmers, community groups, and consumers claim that a diet that consists of local food is better than one that does not. Yet the restricted availability of certain foods due to seasonality, climate, or weather events poses a substantial challenge to consuming only locally grown foods in many regions. Eating a diet of strictly locally produced food is difficult if not impossible in an area like Ithaca, New York, where the outdoor growing season lasts about six months. Some staple foods in this climate are available at farmers' markets for only a few weeks of the year. Certain foods can be stored or preserved, but it could still be difficult to meet nutritional needs by consuming only local foods year round. Not only are there questions of nutritional adequacy, but there are questions about current production levels as well. Two studies conducted in New York State showed that in-state production of fruits and vegetables did not meet current consumption needs (Peters et al. 2002, 2003). Fruit production met only 18 percent of the state's consumption needs, and vegetable production "has the capacity to provide 38 percent" of consumption needs, showing that supply is currently inadequate for the population (Peters et al. 2002, 50; 2003).

Including local foods in a diet, however, does have advantages. Although most market proponents claim that local food is nutritionally better than nonlocal food, few studies have looked at this claim. Advocates assert that because most produce takes 4–7 days to reach supermarket shelves, there is a biophysical decrease in food quality, as sugars can turn to starches, plant cells shrink, and produce loses its vitality (CCE n.d.). On the other hand, most produce sold at farmers' markets is sold within 24–48 hours and thus retains many of its nutrients.

In September 2006 there was an E. coli breakout in 26 states across the United States. Nearly 200 Americans were sickened by eating packaged spinach (FDA 2006). This outbreak highlights some of the complexities and fragilities in the U.S. food system. Seventy-five percent of precut salads bought in the United States are processed by two plants (Pollan 2006). This spinach was washed and packed by a company in California that processes 26 million servings of salad weekly. The Food and Drug Administration (FDA) launched an investigation, which took more than a month to identify where and how the contamination occurred. With heavy consolidation in processing, large-scale contamination is easier, making traceability a long and complex procedure. Customers who seek immediate traceability of the food they consume can turn to farmers' markets, where they can ask producers where and how the food was grown, when it was harvested, and how it was processed.

Environmental Issues

Some consumers have concerns about food being transported over great distances, being overly packaged, and requiring heavy use of fossil fuels. The concept of "food miles" quantifies the distance that food travels from the point of production to the point of consumption (Pirog 2003). In a study of produce sales to Iowa institutions performed by the University of Iowa, researchers found that for certain types of produce, the distance traveled was as high as 1,494 miles. Comparing produce that was available locally to produce purchased from a "conventional"[4] source, they discovered that products from conventional sources traveled on average 27 times farther, but ranged from 8 to 92 times farther (Pirog 2003).

Ninety percent of the energy used in the world food system is consumed in transportation, packaging, and marketing (CCE n.d.). According to the Northeast Sustainable Agriculture Working Group, the U.S. agricultural sector is the largest user of freight transportation services among U.S. economic sectors (NESAWG 2002). In the United Kingdom agricultural goods and food products account for 28 percent of goods transported on U.K. roads (Pretty et al. 2005). Although large-scale production systems are touted as having higher yields, environmental consequences can be high. Pretty et al. conclude that consumer choices, such as whether to purchase organic or conventional produce or locally produced goods, "can have an important effect on farm systems and the environment" (2005, 16).

Some trade groups question the positive impact of local purchasing on the environment. They argue that the best way to minimize agriculture-related emissions is to buy food from the region where it

[4] "Conventional" in this case refers to where produce is normally sourced from, not how it is produced.

grows best. They assert that efficiency is the best tool for conservation and that if farmers can grow efficiently on less land, they can leave more land undisturbed. Since today's supermarkets have highly efficient shipping systems, the amount of fuel used to transport each unit of food is "miniscule" compared with the resources required to grow something that can be grown more efficiently elsewhere (Avery quoted in MacDonald 2006, 2). Although consumers seek locally grown foods, there is no guarantee that all foods grown or raised locally were produced in an environmentally responsible way.

Stakeholders

Farmers

Although many types of farmers participate in farmers' markets, some of the biggest benefits appear to accrue to small, part-time, minority, and immigrant farmers. Nineteen thousand farmers reported selling their products only at farmers' markets, and about 30,000 small farmers and food entrepreneurs earn a partial or full living selling their local products at farmers' markets (PPS 2006). Small-scale farmers are the largest group of growers at farmers' markets, because larger farmers find the economics of farmers' markets unfavorable (Feenstra et al. 2003; Gale 1997). Farms located near major urban areas are more likely to direct market their produce, including at farmers' markets. "On average, farmers' markets contribute 40–50 percent of gross farm sales, which is significant for both full and part-time operators" (Roth 1999, 3). In 2002 direct marketing of agricultural products in the United States accounted for US$812.2 million in sales (USDA AMS 2007d).

In a study of nine farmers' markets in New York State, researchers found that 16 percent of the part-time growers and 21 percent of the full-time growers were women (Lyson et al. 1995). In 2002 women operators made up 11.2 percent of principal farm operators, revealing that a disproportionately high number of vendors in farmers' markets are women (Allen and Harris 2005).

Consumers

The USDA estimates that in 2000 consumers spent US$888 million in urban, suburban, and rural farmers' markets (Becker 2006). The number one reason by far that consumers shop at markets is the freshness of the produce. Other consumer priorities include the quality and variety of the produce, questions of food safety, a growing interest in eating locally and seasonally, and a desire to support local farms (Govindasamy et al. 1998). Gale (1997) found in a survey that in general consumers at farmers' markets were interested in understanding how food is produced and processed and that customers prefer to purchase food that has some assurance of quality, freshness, and safety.

Farmers' markets are often criticized for being elitist or inaccessible to certain populations. The Food and Nutrition Service of the UDSA oversees all federal nutritional programs, including Women, Infants, and Children (WIC), Seniors Program, and Food Stamps, each of which allow participants to buy fresh produce at farmers' markets. In 2000, 58 percent of farmers' markets participated in WIC coupon, food stamps, local, and/or state nutrition programs.

In farmers' markets across the country, vendors accept WIC coupons that allow groups considered "at nutritional risk" to purchase fresh produce. This program, called the Farmers' Market Nutrition Program (FMNP), was established in 1992 with the goal of providing fresh, nutritious, and locally grown fruits and vegetables to WIC participants, as well as to expand the awareness of, use of, and sales at farmers' markets. During fiscal year 2004, more than 2.5 million WIC participants received benefits (USDA AMS 2007c). Additionally, between 2005 and 2006 it is estimated that more than 750,000 low-income seniors in 46 states benefited from the Senior Farmers' Market Nutrition Program. Food stamps are also accepted at certain farmers' markets through the Electronic Benefits Transfer Program. Because food stamps are almost exclusively transferred electronically, certain farmers' markets lack the technology or electrical hook-ups to accept these transfers.

Developing-Country Farmers

Proponents of trade argue that trade is essential for economic development and poverty reduction, claiming that without trade, poor people in developing countries may never be able to escape poverty. Although trade can help lift certain communities out of poverty, policy makers can also work to assist developing-country farmers to seek the most profitable and responsible markets for their goods. In some contexts that might be for export, but in other contexts, a positive solution might be supporting local markets, possibly similar to farmers' markets in the United States. In the

1990s total food imports were about 15 percent of total food production in developing countries (Diaz-Bonilla and Thomas 2001). This finding shows that local production systems are still critical to developing-country populations, so creating policies to support these systems is still relevant and necessary.

Supermarkets

"The modern supermarket model is an accelerator of structural change towards vertical coordination of agri-food chains" (Fox and Vorley 2006, 163). Supermarkets are wielding much greater market shares in many developing countries, especially in East Asia, Southern Africa, and Latin America. From 1992 to 2002, supermarkets increased their retail share by 30 percent in East Asia (excluding China) and 45 percent in Southern Africa (Schwind 2005; Reardon and Berdegué 2002). Large retail supermarkets are heavily consolidated; they operate by centralizing procurement for multiple stores in distribution centers. These distribution centers buy in bulk and look for standardized, uniform produce to streamline their marketing activities. Larger-scale farms, growing produce in a few monocultures, are better able to meet this requirement than are small-scale or diversified farmers. Supermarkets might appeal to some consumers owing to their marketing strategies, high-quality produce, high standard of food safety, consistency, traceability of products, and liability to the consumer (Fox and Vorley 2006).

In an effort to meet consumer demand in their stores, the U.S.-based specialty market Whole Foods has initiated a program to sell local produce in their stores, as well as to promote farmers' markets located in their parking lots. This strategy could attract many new customers to their stores, because the AMS estimates that farmers' markets attract customers from about a 10-mile radius, whereas supermarkets attract customers from about a 2- to 3-mile radius.

Policy Options

Policy options for farmers' markets seek to achieve two main goals. The first is to improve the functioning of markets, which is regulated mostly at the local level. The second is to assure that markets realize as many objectives and benefits as possible in the communities in which they operate. This goal can be influenced by national, state, and local policies.

Performing Outreach

Educating consumers on why and how to buy locally grown and raised products at farmers' markets is critical for newly established and ongoing markets. This outreach can be performed by community groups, farmer associations, supermarkets, universities, social service organizations, or other groups. In New York State, Cornell Cooperative Extension (CCE) performs a large amount of community outreach focusing on farm and agribusiness opportunities and management for farmers and on environmental and nutritional education for community members. Its outreach activities include developing educational and promotional market materials for consumers and sponsoring "buy local" weeks. To achieve its goals, CCE, like other organizations across the country, is piloting programs that promote farm-to-institution connections (supplying, for instance, schools and hospitals) and make community-supported agriculture (CSA) shares available to low-income populations.

Forging Links between Different Groups

As highlighted by the Oakland Medical Center Farmers' Market, creative links are being established across the country between farmers, consumers, and the private and public sector. Further partnerships can take place between cooperative extension services, agriculture and farmland protection boards, chambers of commerce, planning departments, economic development agencies, and consumer groups (Hilchey et al. 1995). With more partnerships, additional organizations and communities might have the resources to open or operate more markets.

Complications can arise from unrealistic or improper preparation of markets. For example, cases have arisen where community groups have initiated and opened markets, but too few farmers are able or willing to participate in them.

Assisting Small-Scale, Minority, and Immigrant Farmers

Since small-scale, minority, and immigrant farmers participate disproportionately in farmers' markets, assuring their viability is essential for the operation of farmers' markets. In some areas loan programs need to be established for farmers or entrepreneurs entering markets to help them start or

stay in business. Farmers often face high start-up costs and high costs at the beginning of a growing season, before they have started to make significant sales. Small loan programs can help farmers gain access to capital when they need it.

Improving Access to Farmers' Markets

Making farmers' markets accessible to larger parts of the population will require developing infrastructure that will allow market vendors to accept food stamps through the Electronic Benefits Transfer Program. For all Food and Nutrition Service programs, a vendor must apply to become a certified vendor through his or her state program, which can lead to bureaucratic hassles. During fiscal year 2005, 14,323 farmers, 2,715 farmers' markets, and 1,999 roadside stands were authorized to accept FMNP coupons, an increase from 2004 (USDA FNS 2006). That still means, however that there were more than 1,000 markets (or almost one-third of total markets) that did not accept FMNP coupons. In some areas, therefore, low-income mothers or seniors might not have access to local produce sold at farmers' markets. The federal government fully or partially funds these programs, but the state decides which agency will coordinate these programs, how best to implement them, and whether to provide matching funds.

Integrating Farmers' Markets with Grocery Stores

Since farmers' markets can be inconvenient for consumers if they are out of the way or do not contain a variety of products, one option to attract more customers is to build links between supermarkets and farmers' markets. Just as the supermarket chain Whole Foods has promoted farmers' markets in their parking lots, other markets can follow a similar approach by featuring "farmers' market" sections in their produce departments. Although this approach diminishes the ambiance, entertainment, or community feeling of farmers' markets, it does allow busy consumers to purchase locally grown food and perform multiple tasks in one place. In a case study of farmers' markets in North Dakota, local grocery store managers viewed farmers' markets not as competition but as an attraction, since customers travel to purchase items at the farmers' market and then purchase other items at the grocery store (Goreham 2000).

Providing Regulatory Assistance

Regulations connected to zoning, planning, facilities management, traffic, food processing, labor practices, and health and safety have the largest implications for farmers' market creation, development, and participation. Regulations affect market participants and organizers in three ways. The first is the creation of rules that facilitate participation and access to markets. The second is education and transferring knowledge of these regulations, including changes to regulations, to marketers. The third is assisting farmers in adhering to these regulations. Aiding farmers and market organizers in these areas can allow more and different types of farmers to participate in markets as well as achieve the goals that drive these regulations.

Implementing Traceability Systems

Stronger traceability systems or point-of-origin labeling can be implemented to help enhance food safety and customer confidence. Unlike meat or dairy production and marketing, fruit and vegetable production is currently subject to few preventative regulations; the FDA takes action only when or if there is an outbreak. Current traceability systems vary across industries. Some are voluntary, meaning that private farmers or firms are currently forced to balance the costs and benefits of traceability to determine an efficient level of accountability.

Keeping Better Statistics and Information on Farmers' Markets

The Marketing Services Branch of the Agricultural Marketing Service of the USDA has recently started to conduct research on emerging trends in farmers' markets and market operations and to prepare research reports, reference materials, and fact sheets. These materials are targeted at farm vendors, market managers, and other stakeholders. Until 2002, however, farmers' market managers and participants did not have a central organization that provided support or technical information. The Farmers' Market Coalition was established to serve as an information network and a centralized mechanism for developing, expanding, and supporting markets.

Assignment

Your assignment is to propose the establishment of a local food market from the perspective of a consultant to a community and to identify the most

important policy issues for starting and operating farmers' markets, taking into account the diverse goals of various stakeholders.

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Chapter Eleven
The 2002 Malawi Famine (7-1)
by Erica Phillips

Executive Summary

Famine has been described as "a catastrophic disruption of the social, economic, and institutional systems that provide for food production, distribution, and consumption" (von Braun et al. 1998). Famines have occurred in every part of the world throughout history, and the 21st century is no exception. Millions of people, mainly in Africa, still suffer food shortages and occasionally face famine. Famine can occur not only when insufficient food is available, but also when people do not have adequate "entitlements" to access food (Sen 1981).

From its independence in 1964 through the 1980s, Malawi was a self-sufficient producer of maize in nondrought years (Oygard et al. 2003). Since 2001, however, Malawi has depended on commercial imports and food aid to meet its national needs. Although the 1991/1992 harvest was half the size of the 2000/2001 maize harvest, no food crisis occurred in 1992. To understand what caused changes in national food sovereignty and household food security between 1991 and 2001 and the events of the 2002 famine in Malawi, this case study reviews the decisions, events, and policies before, during, and after the 2002 famine from four angles: availability of food, access to food, underlying poverty, and political and institutional issues.

The availability of food was affected by flooding, transportation bottlenecks, the sale of the government's reserve grains in 2001, and poor crop estimates. Access to food was restricted for some because grain did not reach the most rural areas, and prices soared, making white maize, the staple food, too expensive for many to buy. Underlying poverty was also a factor: 65 percent of Malawians live below the poverty line, HIV/AIDS levels are climbing, and purchasing power dropped in the 1990s, making many people more vulnerable to production shocks and overcoming their coping strategies. Finally, political and institutional issues, such as liberalization of the grain parastatal, the absence of safety nets, and strained relations between the government of Malawi and donors, contributed to the famine.

This case study evaluates the best strategies to pursue national food sovereignty and household food security and analyzes policies that can prevent famine while meeting longer-term development needs—an effort that is necessary to prevent future famines and decrease poverty. It also explores how food availability and access can be assured for remote regions and the poorest citizens and considers whether government interventions or free markets offer the best approach to achieving short- and long-term national food sovereignty and household food security.

Your assignment is to assess the effectiveness of the actions taken by the government of Malawi in 2002, identify policy failures and successes, and suggest actions and policy measures that should be put in place by the government, food aid donors, and the private sector to effectively prevent future famines while striving for long-term national food sovereignty and household food security.[1]

Background

Between 2001 and 2006, six countries in Southern Africa—Lesotho, Malawi, Mozambique, Swaziland, Zambia, and Zimbabwe—each contended with food shortages. In 2002 food shortage led to famine in Malawi, its worst disaster since the Nyasaland famine of 1949 (Devereux 2002). Malawi was the only country out of the six to report deaths caused by hunger.

Malawi is a landlocked country of about 12 million people in Southern Africa. It borders Zambia, Tanzania, and Mozambique and is almost the size of Pennsylvania (CIA 2006). The population grows at

[1]National food sovereignty exists when a country has the means to acquire enough food, whether from national production or imports, to achieve household food security. Household food security "exists when all people of a household, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 2007).

2 percent annually, average life expectancy is 41 years and declining, and the infant mortality rate is 103 deaths per 1,000 live births. The literacy rate is 62.7 percent, and 65 percent of Malawians live below the poverty line (Oygard et al. 2003). HIV/AIDS, with a prevalence of 14.2 percent among the adult population, is the cause of declining life expectancy. Per capita gross domestic product (GDP) is US$600, and overall GDP is US$7.692 billion. Although real per capita GDP rose throughout the 1990s, the level of poverty increased (Oygard et al. 2003).

Malawi is generally divided into three regions—northern, central, and southern. The northern region consists of highlands and is less populated than the southern region, which contains the country's highest population density (Malawi National Vulnerability Assessment Committee 2005). The central region, which contains the capital, Lilongwe, has a mix of rural and urban residents and contains most of the country's poor (Sahley et al. 2005). The flooding and the famine deaths both occurred in the south and central regions.

Agriculture is the foundation of employment and the economy. More than one-third of GDP comes from agriculture, and an additional one-fifth of GDP is related to distribution and retailing of agricultural products. Eighty-five percent of the population lives in rural areas, and 75 percent of the population relies on agriculture for their livelihoods (Oygard et al. 2003). Landholding is split between smallholders, who typically own 0.23 hectare, and large estate owners who grow tea, cotton, sugar, and burley tobacco for export. Agricultural exports account for 90 percent of foreign exchange earnings (Oygard et al. 2003).

Although the majority of citizens grow and consume white maize almost exclusively, most rural Malawian households are net purchasers of maize (Sahley et al. 2005). About one-third of the population is perpetually unable to produce enough food to feed their families for a year and must seek other sources of income to purchase food. Seventy percent of the average Malawian's diet consists of white maize (FAO 2006). Farmers produce one rainfed crop of maize a year. Planting takes place in November/December, and crops are harvested the following April/May. The months before the harvest are called the "lean season" because this is when households run out of the previous year's grain and need to purchase grain on the market. This season is also when maize prices typically peak because the previous year's stocks are running low and less maize is being sold on the market.

Events of the Famine

In his 1981 essay "Poverty and Famines: An Essay on Entitlement and Deprivation," Nobel prize–winning economist Amartya Sen redefined famine as a lack of "entitlements," not necessarily a lack of food. In his entitlement theory, Sen explains that a person can starve not only when he or she cannot produce enough food, but also when he or she does not have the means to exchange labor, money, or other goods for food, or when he or she faces a combination of these circumstances (Sen 1981). With this theory in mind, this case study considers the 2002 Malawi famine from four angles—availability of food, access to food, underlying poverty, and political and institutional issues.

Availability of Food

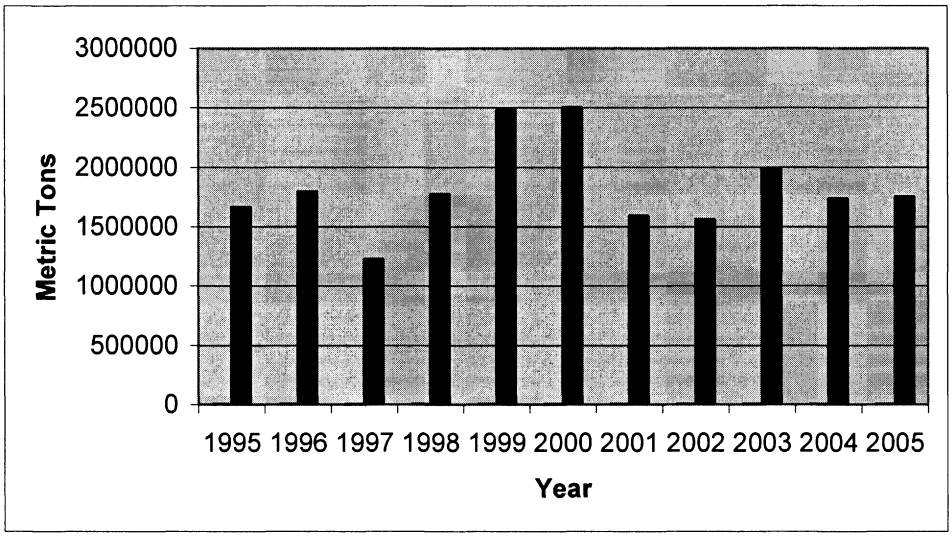
Malawi experienced good harvests in 1998/1999 and 1999/2000, but the 2000/2001 maize harvest was 8 percent below the 10-year average (Figure 1).[2] The four main factors that led to reduced food availability for some Malawian populations in 2002 were poor maize production in 2000/2001, transport bottlenecks for imported food, poor estimates of alternative food levels, and reduced maize levels in the Strategic Grain Reserve (SGR).

Poor Maize Production. From independence in 1964 through the 1980s, Malawi was a self-sufficient producer of maize in nondrought years (Oygard et al. 2003). In the 1990s, however, maize yields fell owing to declining soil fertility. Maize is grown on the same fields year after year with minimal organic or inorganic fertilizer, which causes soils to be stripped of their nutrients and, eventually, degraded. In February 2001 13 out of Malawi's 27 districts experienced serious flooding, which was also a factor in the decrease in production (Oygard et al. 2003).

Another factor leading to poor maize production was the fact that farmers reduced the amount of inputs they used because of lack of access to credit, liberalization of the input market, and reduction of government subsidies on fertilizers

[2] Agricultural years are typically written as "1998/1999," because the planting season begins in the third quarter of the first year, but the crop is not harvested until the second quarter of the following year.

Figure 1: Malawi Maize Production, 1995–2005



Source: FAO 2006.

and seeds. A program called the Starter Pack Program (later called the Targeted Inputs Program or TIP) was initiated in 1998/1999, with distribution to 2.8 million households. "Starter packs" were allocated at no charge to farmers and contained enough chemical fertilizer and maize and pulse seed to cultivate 0.1 hectare (Rubey 2003). The program aimed to provide farmers with free inputs to ease the effects of reduced fertilizer subsidies, combat soil degradation, increase yields, diversify planting with improved varieties, and lead to overall food security (Oygard et al. 2003). Owing to donor concerns about the sustainability of the program, it was downsized, and by 2001 only 1 million households received these packs.

Low yields contributed to grain shortages as well. The area planted in maize in Malawi is between 1.3 and 1.5 million hectares. Yields are about 1,000 kilograms (kg) per hectare, meaning that between 1.3 and 1.5 million metric tons are produced each year. This production falls short of the estimated 1.7 million metric tons needed for national consumption and results in chronic deficits (Devereux 2002).

Transportation Bottlenecks. Because Malawi is a landlocked country, all food imports must be brought in by truck or train, and this situation delayed the arrival of maize imports in 2002. The railway line between Mozambique and Malawi was damaged by floods, and a train derailment on the South African–Zimbabwe border disturbed train traffic for several weeks. Secondary and tertiary roads in Malawi were also damaged by floods and slowed the distribution of food to rural areas (Devereux 2002).

Poor Estimates of Grain Production. Reliable statistics on national agricultural production are necessary so that the government, donors, and the private sector can make sound decisions about importing, buying, and selling grain. The Malawi Ministry of Agriculture and Irrigation (MAI) and the Famine Early Warning System Network (FEWS NET) funded by the U.S. Agency for International Development (USAID) both release figures on production of grains and roots. After the flood in February 2001, FEWS NET and the MAI revised their maize crop estimates, showing a decrease in yields from the year before. In July 2001 FEWS NET predicted that Malawi would have a food surplus owing to high cassava and sweet potato production, which would compensate for the loss of maize due to the floods (Oygard et al. 2003). This prediction proved to be inaccurate and caused a critical delay in the government's and donors' reaction to the crisis (Devereux 2003).

Reduced National Reserves. The National Food Reserve Agency (NFRA) is responsible for stocking grain and protecting Malawians against fluctuations in food production, availability, and prices (Sahley et al. 2005). Since 1999 the NFRA has been an independent trust that runs the SGR on a cost-recovery basis. For three years before 2001, official maize stocks were high, but the NFRA accrued millions of dollars in loans to buy and store this maize and was losing money by holding these stocks. Storage of grain is costly, and losses from spoilage are high. The International Monetary Fund (IMF) recommended that the NFRA sell about 60% of the grain from the SGR to repay some of its loans and hold a smaller reserve so that the large stockpile did not distort market prices (Devereux, 2002). In addition, the IMF recommended that instead of dumping this excess grain on local markets and altering local prices, the NFRA sell its grain internationally. The NFRA followed this advice only partially. Instead of selling half of the reserves, it sold almost all of them, on both domestic and international markets. In July/August 2000, the SGR held 175,000 metric tons, but by mid-2001 virtually all of its stocks had been sold (Sahley et al. 2005).

Access to Food

According to Sen's entitlement theory, famine occurs when people do not have access to food or the means to buy it. The main problems behind the inaccessibility of food in 2002 were poor distribution, high food prices, and low purchasing power, which put maize out of reach for poorer Malawians.

Purchasing power for Malawians dropped in the 1990s, partly because of the devaluation of the Malawi kwacha (MK), which increased domestic prices of imports and led to higher prices for agricultural outputs, higher food prices, and higher unemployment. Even though most rural Malawian households are maize producers, they are net purchasers of maize, because the amount they grow does not meet their household's needs (Sahley et al. 2005). In most years maize prices are lowest after the harvest in June/July and rise about 50–100 percent through December. In December–February prices can spike even higher. Between May 2001 and January 2002, maize prices rose by 450 percent (Oygard et al. 2003). When people could afford to, they bought maize in a panic, driving up prices even more. Poor Malawians who could not afford to buy maize when their own supplies ran out were forced to sell assets, including livestock, to buy food. Table 1 shows the falling relative value of livestock between February 2001 and February 2002, which was one of the most critical months of the famine.

ADMARC. The Agricultural Development Marketing Corporation (ADMARC), Malawi's agricultural marketing parastatal, was established after World War II and historically held a monopoly on selling inputs like fertilizer, seeds, and farm implements to Malawians. In addition, ADMARC was the sole buyer and seller of maize. Prices were set jointly by the Ministry of Agriculture and the Ministry of Finance. In the 1970s and 1980s, ADMARC (and African parastatals in general) came under fire for being "corrupt, rent seeking and subsidizing industry or cheap prices for urban consumers, while not paying farmers based on the actual production costs" (Bates 1981, as cited in Sahley et al. 2005, 46). In 1987, based on pressure from the World Bank and IMF, the government of Malawi allowed private traders to sell maize, ending ADMARC's monopoly.

Table 1: Livestock Prices, Mchinji District, 2001–2002

Type of Livestock	Price in February 2001 (MK)	Price in February 2002 (MK)
Chickens	90–150	25–70
Goats	500–1,000	150–500
Pigs	900–1,800	300–1,000
Cattle	6,000–15,000	1,500–4,000

Source: Kamowa 2002.

ADMARC is still in a transition from having central control over the maize market to operating within a liberalized, free market system. In 2002 ADMARC retained about a 10 percent market share, but it has more influence in the grain market owing to its historic role (Devereux 2002). In 2001 the government was forced to take on loans owed by ADMARC and the NFRA, making up about 2.75 percent of GDP (World Bank 2003). ADMARC decided not to buy maize from farmers during the 2000/2001 season, because there had been a bumper harvest in 1999/2000 and market supplies had been high. In 2001, when the government realized that the initial reports of maize and root production were inaccurate and that the SGR was low, ADMARC announced that it would intervene and purchase maize from domestic and international sources to resell it to those who needed to buy maize. By the time ADMARC made this decision, however, it had a difficult time locating maize for purchase, and it was forced to buy maize regionally at a higher price and ration the quantity sold to citizens. It also faced transport problems (Devereux 2002).

ADMARC also influences access to food by setting a standard market price for maize. In 2001/2002 ADMARC set a price of 17MK/kg for maize. This price was said to be too low to attract the private sector to enter the market, leaving ADMARC to act as the sole importer of maize. Additionally, government signals were unclear, and private traders were not sure when or if ADMARC was going to import grain and sell it at a subsidized rate, cutting the private traders' potential profits. The coexistence of this public distribution channel alongside a free market created confusion between private grain traders and the government.

Urban Bias. Food access was most problematic for rural Malawians, because much of the imported maize remained in urban centers. Urban communities have larger markets and higher purchasing power than smaller rural communities. In addition, poor roads caused transportation problems, and the low price of maize set by ADMARC discouraged traders from transporting it to remote areas (Devereux 2002).

Because Malawi is a landlocked country, it contends with large differences between export and import parity prices. When grain is imported into Malawi, the price it is eventually sold for in Malawian markets reflects the original cost of the product at port, plus the cost of transport into Malawi, making maize more expensive for Malawians than for people in neighboring coastal countries. When grain leaves Malawi, the price that export traders (only ADMARC in this case) pay sellers is lower than in coastal countries, because they must allow for transport expenses to get it to port. "Import parity prices in inland Southern Africa are double or more the local cost of delivery," according to Wiggins (2005, 15). This price differential translates to lower prices paid to farmers for their produce and higher prices charged for imported produce, making food access an even greater obstacle.

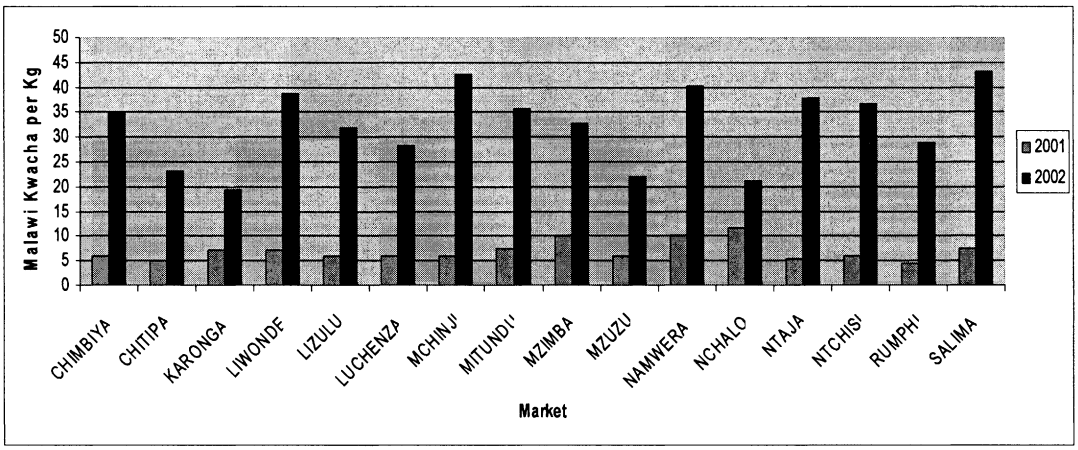
Underlying Poverty and Vulnerability

In 1991/1992 Malawi experienced a drought that reduced maize production to 657,000 metric tons, less than half of the 1,589,440 metric tons produced in the 2000/2001 harvest (FAO 2006). Yet there were no hunger-related deaths in 1992. What changed between 1991/1992 and 2001/2002 to make households less able to cope with production shocks and cause a famine in 2002?

Between 1996 and 2001, the poverty rate rose from 60 to 65 percent (Bookstein and Lawson 2002). Some of the factors that contributed to the vulnerability of the population were high HIV/AIDS rates, low education rates, declining agricultural productivity and soil fertility, limited off-farm income-generating activities, low rural wages, restricted access to agricultural inputs in the 1990s due to economic liberalization, maize production levels that failed to keep pace with population growth, and a decline in purchasing power.

A large share of the population experienced a decrease in income. In the central region of Malawi, more than 40 percent of farmers grow tobacco, but in the northern and southern regions, less than 20 percent do (PMS 2000). Smallholder revenues from tobacco, the primary export earner, dropped nearly 50 percent from 2001 to 2003. This decline was blamed on excess production growth over demand growth and decreased quality of tobacco due to new and marginal growers who entered the market (FAO 2003). Additionally, off-farm labor opportunities decreased in urban areas, neighboring countries, and tobacco farms (Rubey 2003). One source of income that Malawians had relied on was remittances from mines in South Africa, Zambia, and Zimbabwe. Until the early 1990s, these remittances provided mostly southern Malawians with money for household goods, agricultural inputs, and investments in livestock. The loss of these

Figure 2: Comparison of Local Market Maize Prices, February 2001 and February 2002



Sources: 2001 data estimated from FEWS NET 2002; 2002 data from ReliefWeb 2003.

mining opportunities affected not only the families who relied on remittances, but also the people employed by these families, who, with this added income, could afford to pay hired *ganyu*, or paid agricultural labor, as well (Wiggins 2005). Farmers rely on *ganyu* to supplement their incomes for purchasing household food, and it is critical for household food security. The average rate paid for *ganyu* labor is MK 20/day.[3] At the time of the famine, food prices in some areas were as high as MK 40/kg of maize (Devereux 2002).

The HIV/AIDS rate is 14.2 percent for adults. The epidemic exacerbates poverty, because AIDS-affected households have fewer adults contributing to productive activities and more time is allocated to "nonhousehold" management activities. Increasing numbers of sick family members, orphans, and foster children add more pressure to already stretched resources of social networks (Oygard et al. 2003).

Finally, availability of land has become a constraint, especially in the more heavily populated southern region. Given that more than half of a household's income is derived from food produced by the household, land pressure can have serious implications for food security (Sahley et al. 2005).

[3] In January 2002, MK 1 = US$0.016 or US$1 = MK 64.33.

Political and Institutional Issues

The final set of factors leading to the famine was political and institutional. The government of Malawi was blamed for not ensuring entitlements to its citizens by being slow to react to the crisis and not having a contingency plan or an effective and timely safety net.

In addition, donor-government relations were strained at a critical time owing to corruption allegations, which caused some donors to pull out of the country and led to a delay in responding to the crisis. In November 2001 several major development donors, including Denmark, the European Union (EU), the United Kingdom, and the United States, all suspended aid operations. Donors claimed that they were unaware of the severity of the crisis until it was too late. They said they did not know about the sale of the SGR grain, they believed that ADMARC's commercial imports would cover the gap in food needs, and they were unaware that the roots and tubers production estimates were inflated and inaccurate. Owing to mistrust of the government, donors insisted on trying to confirm reports of food shortages before acting (Devereux 2002). Finally, it appeared contradictory to donors that they were asked for food aid in the same year that the SGR exported large amounts of grain. This situation supported donors' suspicions that there was mismanagement and corruption in the government, making it an unreliable partner.

Effects on Households

It was reported that between late 2001 and mid-2002, as many as 3,000 people died from hunger (Devereux 2002). Toward the end of 2001, households resorted to eating low-quality foods, such a maize husks, roots, and sawdust to survive (Wiggins 2005). Rationing, which takes place in normal years during the lean season, went further in 2002, as some families were forced to eat one meal every four days. Some families could not farm because they were too weak or needed to look for food elsewhere. School attendance dropped in affected areas. Deteriorating malnutrition rates and heightened susceptibility to disease became a problem, and cholera caused thousands of deaths at the same time as the famine, because many people were malnourished and weak. Mortality peaked in February–March 2002 (Devereux 2002).

Stakeholders

The stakeholders in this case include the government of Malawi, international nongovernmental organizations (NGOs), international donors, private grain traders, and the farmers and citizens of Malawi. The government is composed of numerous administrative offices and ministries, of which the most influential in this case are ADMARC, the NFRA, and the Ministry of Agriculture and Irrigation (MAI). The MAI influences the production of grain, and ADMARC and the SGR manage that grain once produced. They also control and influence certain sectors of the agricultural input and output markets. The overall goal of the government of Malawi is to provide food security for its citizens, but it must figure out the best way to do that, including how much, if any, government intervention is needed. Private grain traders are eager to enter the grain market and are monitoring the government to see where, how, and if they can enter the grain trade as ADMARC pulls out.

International NGOs and donors had a large impact on the Malawian government in the months leading up to and during the relief and recovery stages of the famine. Although the IMF's influence on the sale of the SGR grain proved to be controversial, the government still relies on external funding from the World Bank, the IMF, and individual donor countries for many of its operations. Maintaining relations with these donors is therefore necessary for essential programs related to food security.

Finally, Malawian civil society, including farmers and citizens, is a key stakeholder. It is the food security (or insecurity) of these people that is critical for the functioning of the Malawian state. Since 90 percent of the population lives in rural areas, farmers are scattered, and many live far from urban centers, where decision makers reside. This dispersion limits rural people's influence on policy making. But given that more than one-third of Malawi's GDP came from agriculture in 2005 (CIA 2006), farmers' needs cannot be ignored.

Policy Issues and Options

The government of Malawi has said it is committed to ensuring food security (Sahley et al. 2005). With its restricted resources, however, the government is currently not capable of providing either national food sovereignty or household food security. Therefore, adopting policies that ensure availability of food and entitlements to access food is the government's most reasonable option. An appropriate policy package should contain a balance of long- and short-term measures that help people through and out of a crisis toward long-term development objectives. According to the International Food Policy Research Institute (IFPRI), longer-term planning can be achieved when relief, recovery, and development projects are "combined and sequenced with each other in mutually reinforcing ways..." (IFPRI 2002, 5).

The following sections and Box 1 present multiple policy issues and options that address the problems of food availability, food accessibility, underlying poverty, and institutional dilemmas. These policies often have overlapping impacts—for example, policies aimed at improving food availability might also lead to poverty reduction. Conversely, the multiple effects of these policy decisions can cause unintended consequences for different social groups or other policy outcomes. This section analyzes policy options on a continuum of short- to longer-term options.

Shorter-Term Food Security Strategies

Disaster Contingency Planning, Humanitarian Assistance, and Safety Nets. A country must declare a state of emergency in order to obtain international humanitarian assistance. Malawi did not officially recognize the food shortage or declare a state of emergency until late February 2002 (Devereux

Box 1: Policy Issues and Options by Category

Availability of Food

1 Liberalization of the market (ADMARC versus the private sector)
2 Strategic Grain Reserve
3 Targeted Inputs Program
4 Regional maize trade
5 Crop diversification

Access to Food

1 Liberalization of the market (ADMARC versus the private sector)
2 Price stability
3 Rural infrastructure
4 Trade; growing of cash crops for income

Underlying Poverty

1 Socioeconomic development (education, health projects, off-farm employment)
2 Access to credit
3 Trade; growing of cash crops for income
4 Long-term agricultural development
5 Safety nets

Institutional Issues

1 Disaster planning and preparedness
2 Safety nets
3 Government transparency
4 Cooperation among stakeholders

2002). Until then, there was no disaster management plan at the state or regional level (Mano et al. 2003). Soon after the president's declaration, the World Food Programme (WFP) launched an Emergency Operation (EMOP) to feed 300,000 people (WFP 2007).

The WFP donated emergency food aid to Malawi beginning in 2002 and continued to operate relief and recovery food aid programs through January 2007,[4] was distributed through a consortium of international and local NGOs. Other major donors included the UK Department for International Development (DFID), the EU, and USAID. Short-term food aid helps avoid immediate hunger and suffering, but long-term food aid can cause disincentives to farmers and markets. Many donors and development practitioners are concerned that a country and its food-insecure populations can become too dependent on food aid. In 2005, three years after the 2002 famine, it was estimated that the WFP was supplying food to 11 percent of Malawi's population (Sahley et al. 2005).

Since 2002 Malawi has formed various task forces and groups, including Vulnerability Assessment Committees and the Joint Task Force (JTF) to coordinate the humanitarian response for Malawi.

[4]In January 2007 the WFP continued non-emergency activities targeting food distribution to persons with HIV/AIDS and tuberculosis, mother and child health clinics, programs for orphans and other vulnerable children, food-for-work projects, and school-feeding activities.

Another means of preparing for food shortage is creating more reliable information systems that compile local and regional crop estimates and market prices. Mali, for example, has invested in a strong agricultural market information system.

To mitigate potential food crises, the Malian government disseminates market information to partners and private traders (Council on Foreign Relations 2005).

Even though the SGR, ADMARC, and TIP are often considered safety nets, they proved unreliable in 2002. Policies need to create effective safety nets for food-insecure Malawians in the context of both rural and urban populations and limited government resources. Programs such as local public works and food-for-work programs that exchange work for food or income to buy food are options. The advantages of such programs are that they are relatively quick to establish, can be targeted to the poor, do not undermine development efforts, and do not distort market prices (Council on Foreign Relations 2005).

Strategic Grain Reserve. The SGR is perceived as a way to ensure food security in times of food shortages or when supply cannot be obtained though other reliable channels. Questions of management, functioning, and financing, however, make the SGR an uncertain safety net during a food shortage. In the 2002 famine, there was not enough grain left in the SGR to provide a safety net to needy citizens. Additionally, grain storage is expensive, and spoilage leads to large losses. Storing grain for two to three years can double the real cost of stored grains (Wiggins 2005).

Preserving large grain reserves can be a disincentive to private traders. Uncertainty about when grain will be sold or if it will be subsidized by the government has been shown to prevent private traders from storing grain (Oygard et al. 2003). If private traders were assured of their role in the market and had a better market information system, they could be responsible for importing maize when needed. It is even argued that if there were no SGR or if the private sector were stronger, millers and farmers would have more incentive to store grain and possibly even make the SGR obsolete. Alternatives to storing grain are holding foreign currency reserves for buying grain, creating a strong system of preparedness for food shortages, and using futures markets (Mano et al. 2003).

Should the government of Malawi keep the grain reserve or get rid of it? Is it justifiable to use the SGR as a safety net? If retained, how can the SGR be made more efficient? Should it continue to be subsidized? How could the government ensure honest accounting mechanisms and a system of checks and balances?

Targeted Inputs Program (TIP). TIP has been criticized as too costly, and its cost was the primary reason it was scaled back in 2000/2001. TIP is funded mainly by external donors because the public sector is facing other budget priorities, such as education and health. Some donors argue that free or subsidized input programs may have hampered the development of efficient input supply services because they interfere with incentives for private sector investment. Also, logistical, financial, and management delays in public programs caused the input packs to arrive late to farmers and incorrect products to be distributed to certain regions, which reduced the economic returns from these inputs (Oygard et al. 2003). The fact that funding for the TIP comes from donors raises questions of stability and sustainability.

The government has argued for maintaining TIP because it believes that increased yields are necessary for obtaining household food security. After fertilizer subsidies were removed, fertilizer use declined, and so did yields. Because the input packs have the potential to increase yields by 100–150 kg per hectare, they could increase household food security (Oygard et al. 2003). Finally, proponents argue that it is cheaper to distribute packs than to distribute food aid.

Free-input programs can improve food security by raising crop yields in the short term, but they can simultaneously inhibit long-term private market growth in the input sector. Should the government and donors continue to fund expensive input programs? Do the benefits outweigh the costs? Is TIP serving as a social safety net whose elimination would harm farmers? What kind of exit strategy for the input program is reasonable, and how can farmers be provided with access to fertilizer and improved seed varieties after the program?

Fertilizer Subsidies. In light of the high prices of inputs, Malawi's declining soil fertility, and farmers' weak purchasing capability, another option for making inputs more available to farmers is fertilizer subsidies. Such subsidies would benefit fertilizer suppliers and farmers who would otherwise not

have access to fertilizers. "Fertilizer transfers are no longer viewed as an effective livelihood development strategy. It has instead become a critical part of the national safety net. The population is united in support of a fertilizer subsidy" (Sahley et al. 2005, 41).

Reducing fertilizer subsidies was part of a structural adjustment program, but it proved unpopular, so the president at the time defied the conditions imposed by the IMF and World Bank and maintained fertilizer subsidies. Untargeted subsidy programs like this one, however, are costly, have a less direct impact on poor households than targeted ones do, and limit private sector participation. Some experts have argued that in the long run, investments in infrastructure and agricultural research to increase productivity have a stronger effect on the cost of inputs than subsidies do.

Market Liberalization. Except for the government's intervention in maize (through ADMARC) and fertilizer and seeds (through TIP), Malawi's agricultural market has been liberalized. Because ADMARC is only partially privatized, however, "Malawi is suffering all of the instability of the market but reaping none of the benefits" (Rubey 2003, 3). A chicken-and-egg scenario is being played out by the private sector and the government. The government is reluctant to fully privatize the parastatal until it knows that the private sector has the infrastructure and capacity to respond to demand. Government officials fear that if the private sector is given complete control of the market, prices will be volatile and will increase and there will be a lack of maize in parts of the country at critical times of the year (Oygard et al. 2003). Obviously, the government does not want to risk a shortage of staple foods, so in 2001/2002 it chose to intervene, resulting in a budget deficit and high interest rates (RATES 2003). On the other hand, the private sector is unwilling to invest heavily in storage facilities, trucks, or marketing as long as the parastatal exists and creates an uncertain environment for the traders.

ADMARC's policies not only affect private sector traders, but can also impact household production, purchasing, and consumption patterns. For example, if the price of grain is set below the market equilibrium price, households might shift from eating other staples like cassava to eating maize, or they might be less motivated to plant or store maize. If the price is too high, however, it would exclude some consumers from the market.

Research has shown that countries in Southern Africa with relatively open markets are better able to fill food gaps than countries where the government is directly involved or restricts private sector trade (Mano et al. 2003). The years after the 2002 famine in Malawi support this theory. In 2003 the private sector imported as much as 200,000 MT of maize, about 80 percent of the amount the government imported that year (Mano et al. 2003). Thus, with the proper incentives (or lack of disincentives), the private market can be quite active in importing grain.

If the government fully liberalizes the market, it will be difficult to guarantee that people in the most remote areas will have access to food, given that incentives are low for the private sector to invest in areas where transport costs are high, surpluses are small, and purchasing ability is low. What role, if any, can ADMARC play in a fully or partially liberalized market situation? What policies could the government pursue to promote the private sector's diffusion into poorer, rural areas?

Longer-Term Food Security and Development Strategies

Self-sufficiency versus commercial crops. Various strategies are proposed for achieving national food sovereignty and household food security. Some policy makers want to strive for national food sovereignty by achieving self-sufficiency in cereals, given that Malawi is a landlocked country in a politically unstable part of the world. Self-sufficiency in maize would mean improving maize production and diversifying food crops by, for instance, increasing production of cassava, sweet potatoes, or potatoes. It costs three to four times more to import maize than to produce it, so self-sufficiency could be an economically viable option (Devereux 2002).

Other policy makers support market-based solutions or trade to ensure food access and availability. One option for achieving both national food sovereignty and household food security is to expand the production of cash crops, like burley tobacco, cotton, sugar, and tea, for regional or international trade. This approach would increase incomes and allow people to buy more food, since rural households typically spend 80 percent of their income on food (Sahley et al. 2005). To be successful, however, farmers need technical knowledge about growing these crops, input and output markets for these crops, and infrastructure

that could facilitate these markets. Remote areas of the country have not attracted private traders to replace ADMARC's closed markets, leaving some populations with no agricultural input or export market. Poor infrastructure contributed to private traders' reluctance to enter these rural markets (RATES 2003). Another complication is that if small farmers believe growing cash crops will earn a higher income than staple food crops, they may not plant staple crops, which could lead to further food shortages (IFPRI 2002).

Since household incomes, foreign exchange earnings, and the majority of jobs in Malawi all rely on agriculture, and given that most farmers are net food buyers, policy options that seek to improve household food security and stimulate the economy should promote increases in agricultural productivity (PMS 2000). In the past donor programs and government policy focused on increasing productivity of smallholders, who produce 90 percent of Malawi's maize (Oygard et al. 2003). Improving poor farmers' access to technology that could reduce their costs and increase their yields could lead to better household food security. Achieving this would require a long-term investment in agricultural research. Other policy options include promoting on-farm crop diversification (for consumption or export), creating farmer organizations, and strengthening rural institutions.

Trade. Policies that encourage trade can also help ensure access to and availability of maize. Currently, however, food aid causes market distortions and, as mentioned earlier, private sector investment is lacking. As a result, some people ask if trade makes sense for a landlocked country in a food-insecure region of the world.

Malawi does not have a comparative advantage in growing maize, so some argue that trade policies that allow for efficient and timely transportation of maize are best. As mentioned, current yields result in chronic deficits (Devereux 2002). Maize is highly drought sensitive, and given Malawi's agroclimatic conditions, other crops, such as millet, sorghum, cassava, rice, and potatoes, might produce higher yields. These crops, however, may not be socially acceptable, and they lack markets and processing facilities (Mano et al. 2003).

Countries with liberal trade policies appear better able to close food gaps through trade than those in which the government is most involved (Sahley et al. 2005). Regional trade possibilities exist with Mozambique, Tanzania, Zambia, and Zimbabwe. Mozambique does not suffer the same land degradation or import-export parity that Malawi does, so a trade relationship with that country could help smooth Malawi's markets (RATES 2003). If infrastructure for the maize market between the two countries is improved, the tobacco market, Malawi's largest export income earner, could benefit from spillover effects. In 2002 and 2003, high volumes of cross-border trade improved the availability of maize.

Regional trade could also benefit Malawi. The region's large size and agroecological and climatic variation all but guarantee adequate production, which could be traded, in part of the region each year (Mano et al. 2003). In some areas it may be more economically beneficial to trade across borders than domestically, given weak infrastructure. Northern Mozambique and southern Tanzania are both areas of surplus production and could be reliable grain sources.

Socioeconomic development to reduce livelihood vulnerability. According to Wiggins (2005, 8), "Widespread poverty translates into vulnerability; poor households have fewer assets and restricted options to cope with shocks." To combat this vulnerability, multisector development programs are needed to raise incomes of the poor, stabilize food sources and inputs, address HIV/AIDS, provide education, and promote off-farm employment.

In 2003 there were 84,000 AIDS deaths in Malawi; the HIV prevalence rate is 14.2 percent for adults (UNAIDS). The effects of HIV/AIDS on food security are threefold: it affects farm production and incomes, it undercuts the ability of households to cope with shocks, and it affects national economies and governments. Most studies conclude that labor-saving techniques and diversification of food production and income are essential for farmers and farm households affected by HIV/AIDS.

Assignment

Assess the effectiveness of the actions taken by the government of Malawi in 2002, identify policy failures and successes, and suggest actions and policy measures that should be put in place by the government, food aid donors, and the private sector to effectively prevent future famine while striving for long-term national food sovereignty and household food security.

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Chapter Twelve
Persistent Food Insecurity from Policy Failures in Malawi (7-2)
by Suresh Babu and Prabuddha Sanyal

Executive Summary

Even in the era of globalization, several countries in Africa continue to face chronic and persistent food insecurity. Malawi is one such country. Following a weather shock in 2001, Malawi suffered severe food crises during 2001/02 and again during 2003/04. The main causes of these crises were both natural and manmade. Although poor rainfall resulted in low agricultural productivity, inefficient government policies exacerbated the crises. The reduction in per capita food availability due to low production led to a dramatic increase in food prices. The rapid increase in prices, combined with low purchasing power of a large section of the Malawian population, adversely affected household food access. The government's erroneous food price policies added to the crises, thwarting the efficient functioning of food markets and resulting in starvation-related deaths in some districts.

Maize is the dominant food crop in Malawi, and its yield is highly sensitive to weather variations. Several programs and policies have attempted to increase the productivity of maize and help consumers gain better access to food. Yet misguided policies and their inconsistent implementation remain a major impediment to achieving food security for all Malawians. This case study illustrates this proposition with two policy examples. The first example shows that although Malawi's Starter Pack Program—free distribution of hybrid maize seeds and fertilizers in small packs to smallholder farmers—initially improved food security, premature scaling down of the program to a targeted program during the low-rainfall period of 2001/02 resulted in food crisis. The second example shows how government intervention to subsidize maize prices through parastatal outlets kept maize prices artificially low. This action led to poor incentives for private traders to import food during the periods of food deficit and thereby contributed to the food crisis.

Several policy responses can address production and market failures and help in avoiding future food crises. These responses include developing small-scale irrigation systems, increasing smallholder access to modern inputs, and improving market infrastructure and trade. Social safety nets to smooth consumption shocks and provide income opportunities during crisis periods are also important. Consistent and well-informed policies can help reduce the impact of future food crises. The challenge to Malawian policy makers is to design, sequence, and implement such policies and programs.

Your assignment is to develop a set of policy recommendations that will prevent future food crises in Malawi.

Background

Geography

Malawi is a landlocked country in Southern Africa. It is bordered by Mozambique to the east, south, and southwest, the Republic of Tanzania to the north, and Zambia to the west. It ranks among the world's least-developed economies. With a population of 12 million, it has one of the highest population densities in Africa—128 people per square kilometer. The majority of the population (85 percent) lives in rural areas. The northern region is the least-developed part of the country and is less densely populated. The central region is home to 40 percent of the population and is the location of the capital city, Lilongwe. This region includes many commercial tobacco estates and has some of the country's most fertile and productive land. The southern region is the most densely populated, with about 47 percent of the total population (IFAD 2007). Lake Malawi covers one-third of the surface of the country with freshwater.

Agriculture

The economy of Malawi is predominantly agricultural. Agriculture accounts for about two-fifth of gross domestic product (GDP) and four-fifths of export revenues. Agricultural production in Malawi

depends mainly on seasonal rainfall. The northern region has abundant rainfall, whereas the southern region is prone to drought. Although all of the country's 27 districts have access to a body of water, less than 1 percent of all cultivated land is under irrigation. More than 98 percent of rural Malawians are semi-subsistence farmers. About 2.5 to 3 million smallholder farmers cultivate about 2.4 million hectares under customary land tenure.[1] Maize is the principal food crop, but smallholder farmers also cultivate other cash crops such as burley tobacco and groundnuts. During good harvest years, Malawian farmers are able to produce 2.3 million metric tons of maize, which is important for achieving food security. Tobacco is the main export commodity and accounts for more than half of export revenues (IFAD 2007; World Bank 2006).

Food Insecurity in Malawi

Malawi continues to suffer from chronic and persistent food insecurity. With recurrent droughts and floods, food policy management becomes critical to prevent food crisis. Typically, unfavorable weather conditions combined with low input use (due either to low fertilizer availability in the market or to its high prices) result in low crop yields, which aggregate to food deficits at the national level. Given that food production depends on unimodal rainfall—that is, a single rainy season in a year—food prices fluctuate according to the availability of food in the market. Because most of the rural Malawians who own and cultivate small pieces of land are net buyers of food, seasonal variability in food prices affects their access to food at the household level.

Without appropriate government interventions, these households live in a vicious cycle of food insecurity and poverty: Low food production resulting from low input use leads to low income and low food entitlements. Low income further results in low investment in productivity-enhancing inputs in the next season. Several policies and programs have attempted to break this vicious cycle. Yet policies that are ill conceived and poorly implemented can do more harm than good for the poor.

What Makes Food Insecurity in Malawi Persistent?

The following example typifies the plight of the majority of the rural households who are caught in the vicious cycle described. About 50 percent of smallholder farmers in Malawi cultivate less than one hectare of land. In a normal season, a farmer cultivating one hectare of maize will plant in October/November immediately after the first major rainfall. Maize is grown for the next five to six months and harvested in April/May.

In normal years maize yields depend on the technology used by farmers. A farmer growing local maize varieties without using fertilizer will on average harvest 800–900 kilograms (kg) of grains per hectare. This harvest can rise to 1,200 kg per hectare if adequate chemical fertilizers are applied on time. A farmer growing improved varieties of seeds with chemical fertilizers could obtain a yield up to 2,000 kg per hectare. Thus, in normal years with adequate rainfall, farmers using modern inputs could double their food production.

Several factors make this ideal production scenario less likely. First, availability of land for food production is an increasingly limiting factor under the customary land system. Because of increasing population density, land availability for individual households is shrinking over the years. The second factor is the weather shocks during the crop season. If rainfall at the beginning of the season is delayed or inadequate in quantity, farmers will delay the planting of maize. Late planting reduces yield considerably. Furthermore, even if rainfall is adequate at the beginning of the season, low or erratic rainfall during the crop season can reduce crop yields. The months of February and March are particularly critical. If rains fail in this period, yield reductions are certain. Third, inadequate use of chemical fertilizers and lack of improved varieties of seeds can result in low yields even in years of normal rainfall. Smallholders' low purchasing power prevents them from investing in improved technologies, particularly when the cost of chemical fertilizers is high. Fourth, low labor availability at the household level can result in a low level of

[1] There are two main land tenure systems in Southern Africa—customary and statutory tenure. In customary tenure, access to land is governed by community membership and controlled by the chief of a village. Households have exclusive rights to cultivate the land, but because land is jointly owned by the community, it cannot be used as collateral for loans. In contrast, under the statutory tenure system, the owner has exclusive rights to the land, which guarantees land tenure security (United Nations Economic Commission for Africa 2003).

planting and neglect of the planted crops. Because food availability is low for poor households during the crop season, they look for casual work outside, even at the cost of neglecting their own farms. In addition, chronic illness resulting from malaria and HIV/AIDS can reduce labor supply. Finally, a combination of these factors can seriously affect food production at the household level.

How does an average Malawian farm household with two adults and four children cultivating one hectare of land perform in terms of food security? With average food production of 900 kg per hectare and a household food requirement of about 90 kg per month, a typical smallholder household will have harvested food for only the next 10 months. Given the household's immediate cash needs, it will sell about half of this food production in the market at the prevailing low prices right after harvest. This leaves the household with food for the next four to five months. By the beginning of the next crop season, this household would likely have run out of stored food. Their survival for the next six months depends on the availability of casual employment in rural areas. Along with employment availability, the wage levels and prevailing levels of food prices will affect their access to food and hence their food security.

Add to this vulnerability the frequent weather shocks that reduce food production. Over the past 20 years six major weather failures have pushed Malawi toward food crises. Government policy responses have consisted of declaring a food emergency and asking donors for help with food aid. But such simple responses have evolved with changing pressures from aid agencies regarding market and price policies. Often, these policies have been ill conceived and poorly implemented. Policy inconsistencies often exacerbate the effects of weather failures, resulting in persistent food insecurity among a large segment of the Malawian population.

Events Leading to Recent Food Crises (2001/02 and 2002/03)

An immediate cause of the recent food crises in Malawi was a decline in food supply resulting from failed rains during the 2001/02 crop season. In February 2002 the Malawi government declared a national food crisis and sought donor assistance. The food crisis made around 3.5 million Malawians (30 percent of the population) vulnerable to hunger and starvation (Cromwell and Kyegombe 2005).

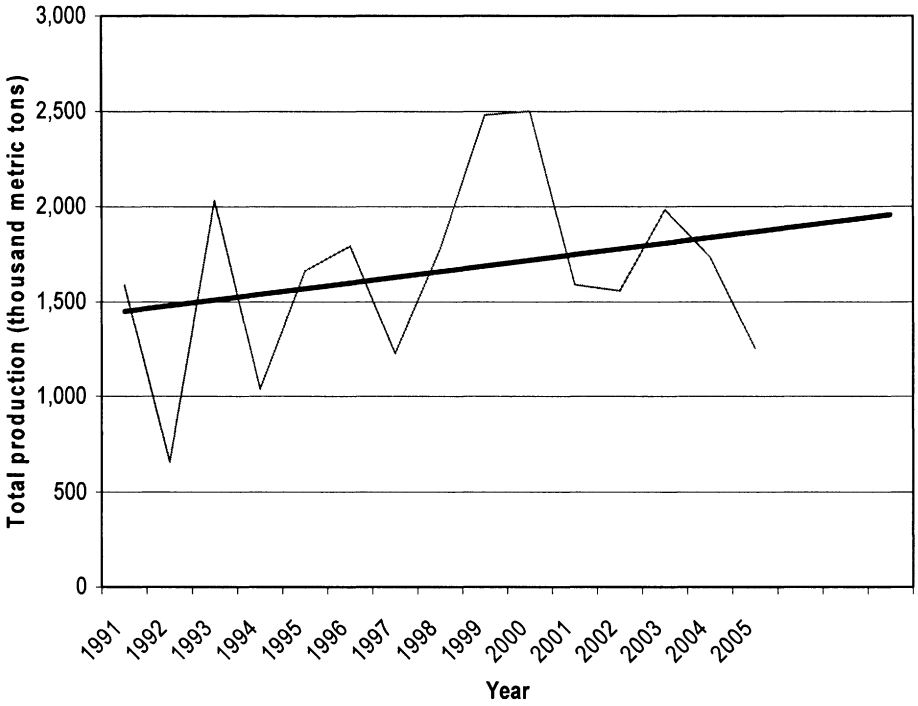
Food security in Malawi depends on the interaction of a complex set of factors. Food availability depends on maize output and the efficient functioning of food markets. Food access depends on the purchasing power of consumers. Thus, it is important to look carefully at the trends in production levels and food prices to understand the food security challenges facing Malawi.

Availability of food. Malawian agriculture depends largely on a unimodal rainfall pattern. Malawi's high dependence on rainfed agriculture and its low agricultural productivity make its households vulnerable to frequent weather shocks.

Figure 1 traces national production of maize from 1991 to 2005. For the 2005/06 year, Malawi required 2.1 million metric tons of maize to ensure food security for its population, which includes 2 million metric tons of maize for food use and the rest for feed and other purposes (GOM 2005). Although overall maize production shows an increasing trend, per capita maize production has been declining since the 1970s (Wobst et al. 2004). During the 2001/02 food crisis, maize production fell dramatically, but it was still 6 percent above the 10-year average (Devereux and Tiba 2006). The decline in per capita food availability is not just a result of low maize production. Population density doubled from 59 to 112 people per square kilometer between 1977 and 1998, while the per capita availability of cropped area declined by half, from 0.42 to 0.23 hectares, leading to an overall decline in per capita food availability (Devereux 2006). Agricultural productivity remained low owing to lack of intensification. High prices and inadequate availability during the crop season impede fertilizer use for a majority of smallholder farmers.

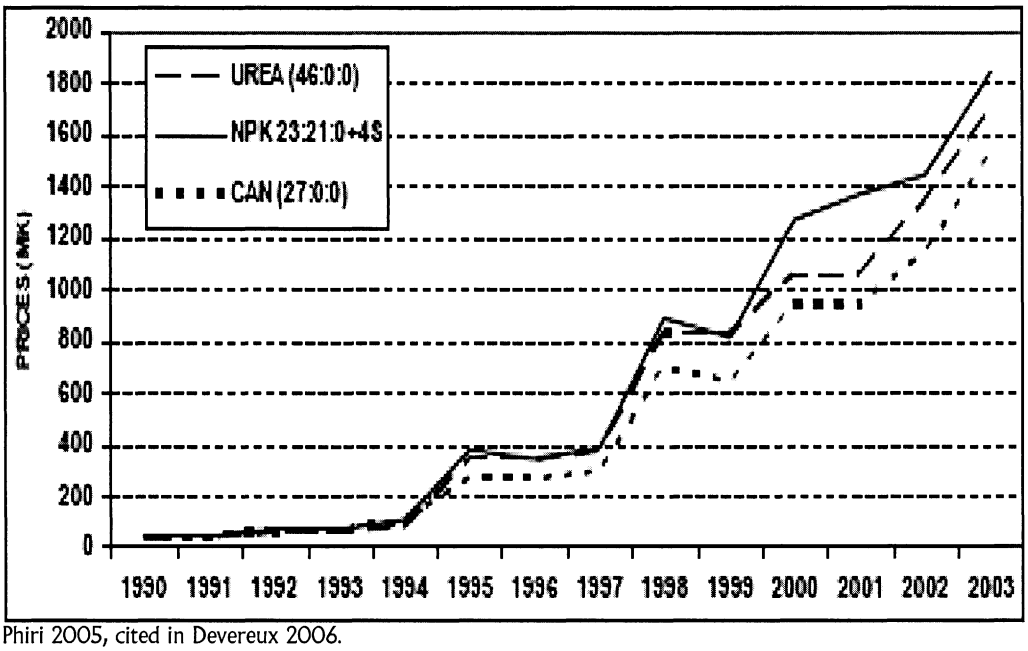
Trends in fertilizer prices. Fertilizer prices have been increasing over the past 15 years (Figure 2). Before the mid-1990s, most smallholders obtained fertilizers and hybrid seeds through credit-in-kind programs from the Smallholder Agricultural Credit Association (SACA). The Agricultural Development and Marketing Corporation (ADMARC), the main agricultural marketing parastatal, also sold fertilizer at a subsidized price. The Government of Malawi phased out fertilizer subsidies, however, as part of its structural adjustment program. Since mid-1990s smallholder farmers have faced open-market fertilizer prices (Devereux 2006). Access to fertilizer

Figure 1: Trends in Maize Production, 1991–2005



Source: FAO 2006.

Figure 2: Fertilizer Price Trends in Malawi, 1990–2003



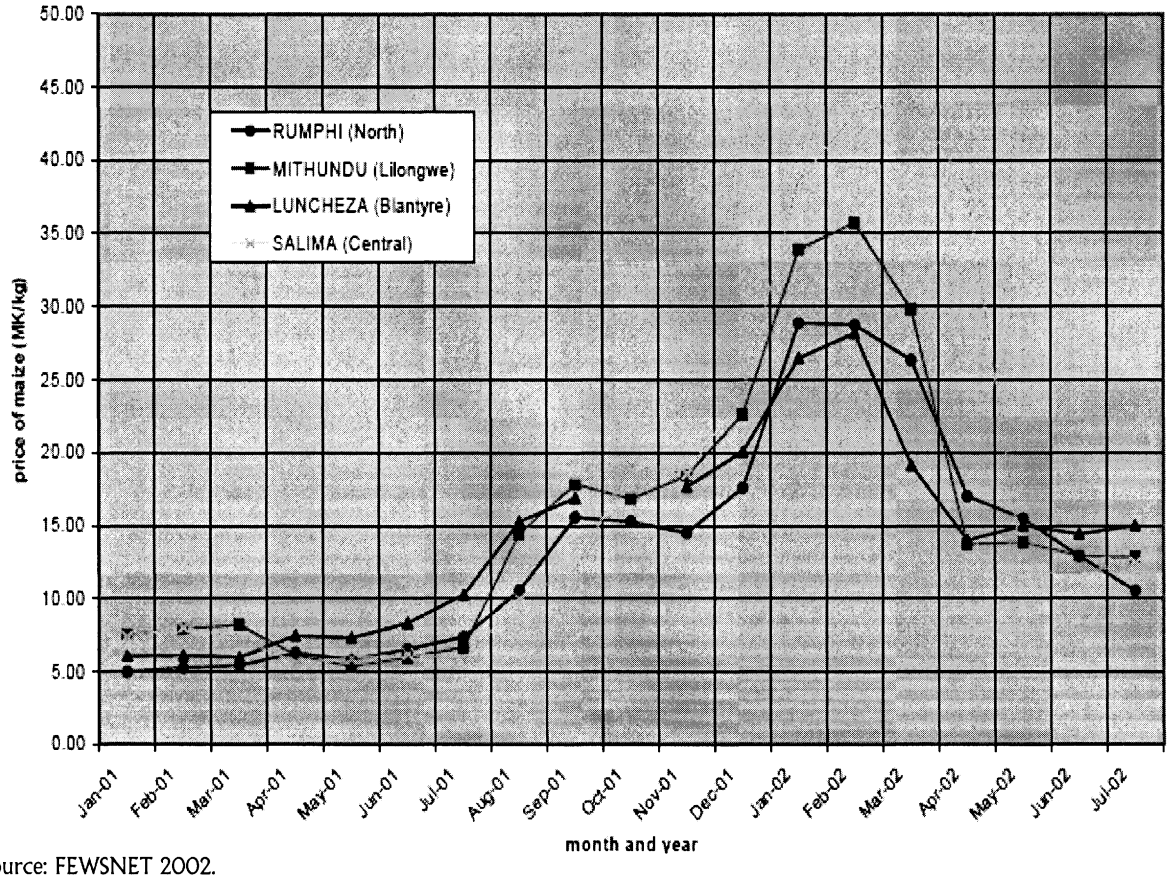
Source: Phiri 2005, cited in Devereux 2006.

has declined owing to price hikes, and as a result fertilizer use is considerably lower for poorer households than for other households (Hoddinott 2004). The government's policy response has focused on increasing smallholder farmers' access to chemical fertilizers, but inconsistent implementation of such policies has kept Malawian households in persistent food insecurity.

Access to food: Trend in maize prices. Both the level and variability of food prices determine food access. In Malawi, food prices exhibit a high level of seasonality. Prices are low during the harvest period (May and June), then increase steadily, and reach their highest levels during the crop season (January to March). Extreme levels of food price fluctuations can trigger a food crisis. For example, during the recent crises, food prices rose to their highest levels between October 2001 and January 2002. Private trade and public interventions failed to stabilize food supplies and prices, resulting in high levels of food insecurity (FEWSNET 2002).

Figure 3 shows the trend of maize prices for selected local markets over the period January 2001 to July 2002. Maize prices rose to reach unprecedented levels during the preharvest period in February and March 2002, when they averaged five to six times higher than their 2001 levels. In almost all the areas, prices began to increase in July 2001 and peaked in February 2002. By May 2002, however, all regions had registered rapid declines in maize prices, with the prices stabilizing at MK 10–15 per kg. Yet this level was two to three times higher than normal prices. Such persistent high prices increased the vulnerability of poorer households and resulted in a high level of food insecurity.

Figure 3: Local Maize Market Prices in Selected Markets, January 2001–July 2002



Source: FEWSNET 2002.

In summary, low and erratic rainfall coupled with reductions in fertilizer use led to a deterioration in agricultural productivity in Malawi during 2001/02. This decline in productivity in turn reduced market food supplies. The reduced food availability caused food prices to rise substantially, leading to food crisis. Poorer households were unable to buy food in the market. Owing to their reduced income, even the better-off households were unable to hire labor. Lower wage rates resulting from surplus labor supply was an additional source of vulnerability for poorer households during this period.

To what extent was low fertilizer use and high volatility in food prices a result of poorly designed government policies?

Policy Issues and Challenges: Two Illustrations of Policy Inconsistency

To illustrate how policy inconsistencies can result in persistent food insecurity, this section briefly reviews two key policy interventions by the Government of Malawi.

Policy toward Increased Access to Modern Agricultural Inputs

Low use of modern technology, such as improved varieties of seeds and chemical fertilizers, results in low crop productivity in Malawi. Soil fertility has been depleted over years owing to monocropping of maize with little application of chemical fertilizers. To increase the productivity of smallholder agriculture, the Government of Malawi has distributed chemical fertilizers and improved varieties of crop seeds after every major food crisis. The Starter Pack Program was initiated in 1998 to provide farmers with free packets of improved seeds and fertilizers for one-tenth of a hectare. It is estimated that the program covered 2.8 million smallholders, with the objective of increasing domestic maize production to 280,000–420,000 metric tons a year (Harrigan 2005). Such a result would circumvent the need for maize imports from neighboring countries and improve the country's strategic grain reserve situation. The government funded this program with the support of donors as an income-increasing strategy to break the vicious cycle of food insecurity and as a mechanism to avoid high-cost food aid programs (Levy 2005).

The Starter Pack Program added 100–150 kg of maize at the farm level, delayed the households' running out of food by one to two months, reduced the market demand for maize during the hungry season, and mitigated seasonal price fluctuations (Levy 2003).

In 2000, based on donor criticism that this blanket approach to provision of inputs was unsustainable and detrimental to private sector development in input markets, the government reduced the Starter Pack Program to a Targeted Inputs Program (TIP). This policy shift eroded the food security benefits of the original Starter Pack Program. Devereux (2006) reports that in 2001 the additional maize production from TIP was only 3–4 percent—a substantial reduction from the 16 percent contribution of the Starter Pack Program in 1999.

Both the Starter Pack Program and the Targeted Inputs Program faced implementation challenges such as delays in procurement and distribution of inputs, low quality of inputs, and poor support from the extension system. The reduced maize production by smallholders in 2001 and 2002 owing to the policy shift, along with these other factors, is often cited as a reason for the food crisis of 2001/02.

The evolution of the Starter Pack Program in Malawi since 1998 and its subsequent scaling down reflect substantial policy inconsistency on the part of the government. Although these subsidies and handouts have been very popular among recipients, several weaknesses render this blanket approach ineffective. First, government intervention in fertilizer markets and frequent changes in policies and institutional set-ups has created uncertainty that discourages private traders from entering the market and thus restricted the development of a competitive fertilizer sector. Second, delays in the procurement of inputs have led to late fertilizer application and thus contributed to yield shortfalls.

Market-Based Interventions to Achieve Food Security

Historically, the Government of Malawi has used a highly interventionist approach to achieve food security. ADMARC, the agricultural parastatal, was established in 1971 to help smallholder farmers gain access to agricultural inputs and to provide them with market outlets for selling and buying agricultural outputs. Its well-established network of outlets throughout the country helped to procure smallholder crops and sell food commodities at pan-territorial prices. Until early 1990s, when

ADMARC came under scrutiny of donors, it operated at a loss while remaining a major impediment for private sector development in the agricultural sector (World Bank 2003). As part of Malawi's structural adjustment program in the mid-1990s, ADMARC was asked to operate as a business entity, which led to the closure of non-profit-making outlets, particularly in remote areas. This policy contributed to higher fluctuations in food availability and food prices, making remote households vulnerable. Although several programs were put in place to encourage private sector development, inconsistent policies have kept private trader participation in input and output markets grossly inadequate. Poor policy signals to the few private traders during the periods of food deficits have tended to trigger food crisis (FAO 2005).

Rubey (2004) illustrates how the Government of Malawi, by continually using ADMARC to intervene in food markets, often with good intentions, creates disincentives for private sector traders. After a poor harvest in May 2001, the Government of Malawi anticipated high levels of food insecurity and decided to sell maize through ADMARC. By fixing the price of maize at 17 MK/kg (the prevailing market price in September 2001), however, it quickly ran out of its maize stock. The low supply of maize in the market due to the poor harvest pushed the maize price higher than ADMARC price, up to 45 MK/kg in some markets. At the same time ADMARC continued to sell at low prices to those who were in the market to buy food. Market prices remained higher than the ADMARC price throughout the hungry season (October 2001–April 2002). The ADMARC price was also low compared with market prices for maize in neighboring countries. This price structure and the high presence of ADMARC discouraged the private sector from engaging in local maize markets. Keeping the maize price artificially low compared with market prices encouraged some private traders to export maize to surrounding countries, further adding to local food shortages. ADMARC's inability to import the needed quantities of maize in time added to the food shortage, resulting in substantial price increases in maize. In short, government intervention in maize markets in a sudden and unpredictable way kept the private sector out of market.

In contrast, although maize production declined again in the following year, the food shortage was manageable for several reasons. The government did not alter the maize price of 17 MK/kg, which it fixed in September 2001. Because the maize price at ADMARC markets was higher than local market prices, private traders were able to import maize from neighboring countries, sell at a lower price, and still make a profit. In addition, the government and aid agencies made information on their imports of maize public. As a result of these factors, maize prices fluctuated little during the lean periods of food availability (Figure 4).

In summary, the government policy interventions during the 2001/02 food crisis showed that policies that create uncertainty about government intentions can throw the markets out of balance and result in huge price increases affecting a large segment of the population. A significant increase in food prices can affect the vulnerable section of the population, whose purchasing power is already low. The Malawi example also demonstrates that inconsistent policies can result in a food crisis. Gradual, predictable, and transparent management of policy options that allow better private trader participation can reduce the severity of food shortages.

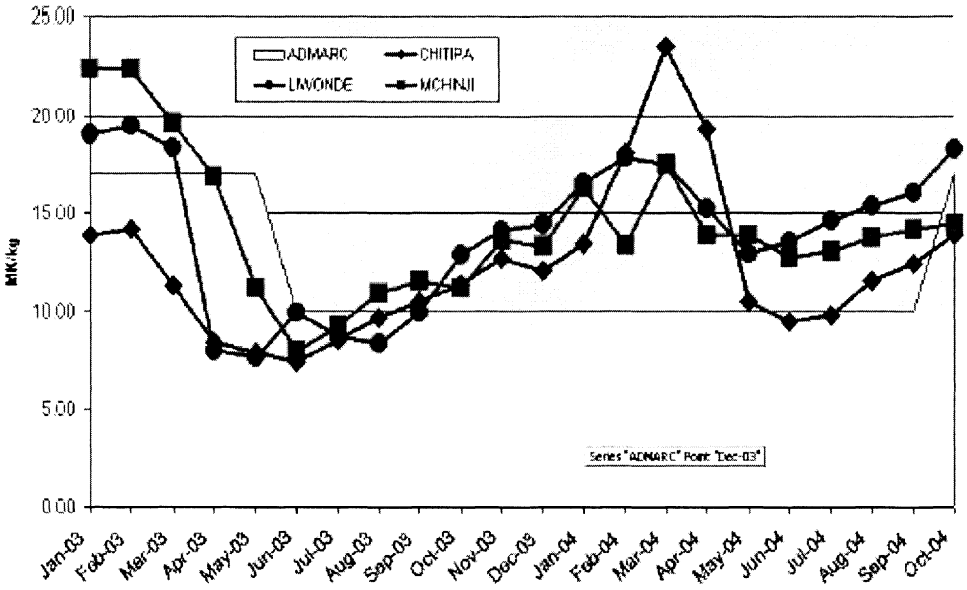
Stakeholders

Preventing future food crises depends on how policies and programs affect various stakeholders in Malawi. An assessment of their roles and influence in shaping policies and programs helps in understanding the challenges and options in policy implementation. The following stakeholders are involved in achieving long-term food security in Malawi.

Smallholder Farmers

Almost all of Malawi's rural population is engaged in smallholder agriculture. Their role in increasing agricultural productivity and rural incomes will determine the poverty and food security outcomes of rural Malawians. Although they are the primary stakeholders of policies and programs aimed at improving rural welfare, their capacity to organize themselves is low. They have very little say in policies that affect them, although smallholder farmer associations are beginning to be organized. This group of stakeholders remains highly vulnerable to production and market failures owing to their low asset base and their low capacity in mobilizing individual and community resources.

Figure 4: Local Market Maize Prices in Selected Markets, 2003/04



Source: FEWSNET 2004.

National Policy Makers in the Government

Responsible for agricultural development, poverty reduction, and food security, national policy makers have a crucial role in preventing food crises. They can exacerbate a crisis if their organizational capacity to respond to food-related emergencies is weak. Although they are answerable to the Parliament on the impact of their decisions, the connection between legislative and administrative branches of government is still weak in Malawi. National-level policy makers are motivated by the long-term goal of achieving food security for all Malawians, yet they are not well connected to the problems at the grassroots level.

Agricultural Development and Marketing Corporation (ADMARC)

ADMARC has been a key player in Malawi's food and agriculture sector. With its field offices located all over the country, ADMARC has extensive outreach to the farming community. ADMARC continues to be the arm of government that intervenes in food markets. It has, however, come under criticism by development partners for its inefficiency and its role in the poor development of private traders in agricultural markets. In Malawi, where entrepreneurship and institutional credit facilities are limited, ADMARC is likely to play a major role in agricultural markets.

Private Traders

Private traders in input and output markets have a large role to play in the agricultural development of Malawi. Not well organized, the private sector in Malawi continues to be at the mercy of government policies for its survival. Although the opening up of grain markets to private trade in the mid-1990s helped many entrepreneurs enter the food market, poor development of infrastructure, low credit availability, and lack of market information prevented this group from playing an increased role in addressing food problems through markets. This group of stakeholders has shown increasing presence lately through cross-border trade of food commodities.

Development Partners

Development partners continue to play a key role in preventing food crisis in Malawi. As advisers on and financiers of development plans and policies, they have a high level of influence over the government's decisions. Yet government policies often go beyond donor recommendations. Because of their commitment to the long-term food security of the people of Malawi, donors are highly

active in food security discussions. They are also free to experiment and intervene in the rural areas directly through the large presence of NGOs and civil society organizations. Development partners have been important for Malawi in its efforts to prevent famine-like conditions through food aid and distribution.

NGOs and Civil Society Organizations

The number of NGOs and civil society organizations in Malawi has been increasing for the past decade. Because of their presence throughout the country and their proximity to media representatives, they are often able to bring the plight of rural communities to the attention of public authorities and development partners. Largely funded by development partners, they have the freedom to experiment with new ideas to solve food security problems, yet their solutions focus on the specific needs of the local community they serve. They continue to play a critical role in shaping Malawi's poverty reduction strategy through their representatives, who participate in the debates and discussions at the district and national levels.

Policy Options

Short-term policy measures alone cannot achieve food security for all. They need to be placed in the context of long-term development strategies. For example, in 2000 Malawi adopted the goal of halving poverty and hunger by 2015 as one of the Millennium Development Goals (MDGs). Meeting this food security goal for Malawi, where poverty has been increasing during the past decade, is, however, a major development challenge. Although the Government of Malawi has attempted many strategies since 2000, including developing a poverty reduction strategy to guide policy in the medium term, it is important to recognize that agriculture will play a crucial role in achieving the MDG described. As evident from the preceding discussion, erratic weather patterns and high input costs lead to food shortages. To succeed in halving the proportion of the population suffering from hunger, Malawi needs to pursue policy and investment reforms on multiple fronts. This section focuses on three options that could lead to improved food security and poverty reduction:

1. increasing agricultural productivity;
2. improving market infrastructure and trade; and
3. providing social safety nets for the vulnerable.

Increasing Agricultural Productivity

Irrigation. Malawi's capacity to irrigate its croplands remains grossly underexploited. With only marginal investments, Malawi could irrigate a considerable area of cropped land using water-lifting systems, given that one-third of the country's landmass is covered by freshwater. This irrigation could substantially reduce the variability in food supply during drought years. Thus, increasing irrigation of croplands and cropping intensity should form a key long-term strategy for achieving food security.

Development of irrigation systems is not without its challenges. High costs of irrigation development and weak institutional capacity to maintain and operate such systems remain major challenges. For example, the estimated average investment per hectare in Africa ranges from US$2,000 to US$4,000 for small-scale projects and from US$9,000 to US$15,000 for large-scale irrigation projects (African Union 2006).2 These high costs, combined with poor credit services, make expansion of smallholder irrigation difficult in Malawi.

Small-scale irrigation systems, however, remain a viable strategy for improving agricultural productivity in Malawi. With application of appropriate irrigation technologies, smallholders in Malawi will be in a position to increase crop production and enhance their own livelihoods.

Soil fertility management. Soil fertility and nutrient management influence agricultural productivity, and thus food security and livelihoods.

Smallholders' access to chemical fertilizers remains a critical issue in increasing soil fertility. Putting in place an appropriate institutional framework for input and output marketing and service provision can improve the accessibility of fertilizers. For example, establishing public-private partnerships with potential private traders and ADMARC to import and sell fertilizers throughout the country

[2] In India the comparable cost for large-scale projects ranges between US$1,500 and US$2,000.

can increase chemical fertilizer use and its timely application.

It is also possible to reduce the cost of fertilizer by increasing competition among fertilizer dealers through training and credit facilities, particularly in the cash crop–growing areas where farmers could afford fertilizer.
For smallholders who cannot afford chemical fertilizer, alternative methods of improving soil fertility need to be promoted. Integrated nutrient management is a proven method that uses balanced and efficient use of organic and inorganic plant nutrients. Using natural resources such as green manures and some chemical fertilizers in various combinations can result in long-term build-up of soil fertility. Use of this approach will require, however, strong institutional support from the extension system for educating smallholder farmers.

Improving Market Infrastructure and Trade

Although a number of private traders have emerged as major players in agricultural markets, they have not been able to close the gap created by the reduction in the number of ADMARC outlets in remote areas. This gap still poses challenges in making food accessible at affordable prices to consumers during the lean season and in supplying agricultural inputs to smallholder farmers. Because the private marketing system is not highly competitive, the monopolistic pricing tendencies of these private traders affect household food security.

Development of market infrastructure and appropriate institutions that facilitate private sector involvement could enable better participation of new entrepreneurs in food and input markets. Reducing policy-related market uncertainty is also important. For example, better market information on prices, production levels, trade flows, and imports can reduce the uncertainties associated with the government's pricing policies. A partnership between ADMARC and the private sector to facilitate imports and trade flows (within and across boundaries) can help if it is carried out in a consistent manner that ensures competition within the private sector.

Safety Nets for the Vulnerable

Safety nets can play an important role in protecting vulnerable households during periods of food crisis. They can also mitigate the effects of short-term liquidity and production shortfalls. A few policy options are relevant for Malawi.

First, the design of safety net programs could be aimed at overcoming the impediments to agricultural growth. Public works programs, such as road construction or small-scale irrigation provision, can provide employment to vulnerable households while supplying infrastructure for agricultural development.

Second, during food crises, it is important to identify the ultra poor and devise strategies that benefit them. Targeted pure transfers can limit total costs to a manageable level and increase the likelihood of program sustainability.

Finally, it is important to choose transfer programs that have multiplier effects for the entire economy. For example, the Starter Pack Program in Malawi resulted in substantial yield benefits and improved maize production, although the program was not sustainable owing to poor targeting mechanisms.

Assignment

Your assignment is to develop a set of policy recommendations that will prevent future food crises in Malawi.

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Chapter Thirteen
Policy Implications of Droughts and Food Insecurity in Malawi and Zambia (7-3)
by Anandita Philipose

Executive Summary

This paper examines the recent droughts in Malawi and Zambia (covering the period 1990–2005 but with a focus on the 2001/2002 Southern African crisis), analyzing the impact of the droughts on food security and the responses to the crises. Several questions make these two countries particularly complex case studies: Why did relatively mild weather shocks lead to such a devastating crisis in 2001/2002? How did lack of coordination between governments and donors exacerbate the crisis? And why, given the historical tendency of these countries to experience recurrent droughts, were no measures put into place to counter the adverse impacts of the drought?

The two countries share a number of characteristics that make them particularly vulnerable to food crises: unfavorable weather patterns, a high dependence on maize as the staple crop, poor health standards, unfavorable socioeconomic conditions, and a high prevalence of HIV/AIDS. The groups that have been most adversely affected in the population include landless people, female-headed households, and the growing number of orphans. Both governments, under pressure from the International Monetary Fund (IMF), began liberalizing their agricultural sectors in the late 1980s and the early 1990s, which increased food insecurity in the countries. One response to drought has been increased food aid, with organizations like the World Bank, the World Food Programme (WFP), the United Nations Children's Fund (UNICEF), the UK Department for International Development (DFID), Oxfam, and others creating and supporting food aid and safety net programs. Food aid, in general, has been the subject of much criticism even though international organizations maintain that food aid is necessary in response to the recurrent crises in Southern Africa.

Policy options include (1) increasing food reserves, (2) encouraging formal and informal trade, (3) creating social protection programs, (5) establishing innovative programs such as the Targeted Inputs Programme and futures contracts, and (6) setting up a global contingency fund.

As an official of an international development assistance agency, your assignment is to design a strategy that will assist Malawi and Zambia in coping with the combined risks of food insecurity, drought, and HIV/AIDS.

Background

This paper examines the recent droughts in Malawi and Zambia (covering the period 1990–2005 but with a focus on the 2001/2002 Southern African crisis), analyzing the impact of the droughts on food security and the responses to the crises. In the 1990s Southern Africa experienced droughts in 1991/1992, followed only two years later by drought in Malawi and Zambia in 1993/1994 and then by drought in countries farther south in 1994/1995. A similar pattern repeated itself after the turn of the century, with the entire region experiencing droughts in 2000/2001 and 2001/2002, with particularly adverse impacts on Malawi, Zambia, and Zimbabwe. Between February and April 2002, the governments of Lesotho, Malawi, and Zimbabwe declared emergencies, and in July 2002 the United Nations sent out an appeal for US$611 million to address the crisis in the six worst-affected countries: Lesotho, Malawi, Mozambique, Swaziland, Zambia, and Zimbabwe (Cromwell and Kyegombe 2005).

What makes Malawi and Zambia particularly complex case studies are questions about why relatively mild weather shocks led to such a devastating crisis in 2001/2002 (Dorward and Kydd 2004), how lack of government-donor coordination exacerbated the crisis (Devereux 2002b), and why, given the historical tendency of these countries to experience recurrent droughts, these disasters were not foreseen and measures not put into place to

counter the adverse impacts of the drought (IEG 2006). In his paper on the 2002 Malawi crisis, Devereux (2002b) said that the disaster stemmed from both technical reasons, such as production failure, information constraints, a depleted food reserve, import bottlenecks, and unaffordably high food prices, and political reasons caused by negative synergies between government and donor policies and practices.

This paper examines the circumstances of the droughts in Malawi and Zambia: the policy issues, stakeholders, and responses to the crisis. In particular, it looks at the policies that exacerbated the crisis, considers the policy responses to the crisis, and provides various policy options.

Food Security in Malawi and Drought

Situating Malawi in Southern Africa. Malawi is one of the poorest countries in Africa, with a per capita gross domestic product (GDP) of US$170 in 2000, which fell to US$160 in 2002. It has some of the world's lowest health and social indicators as well as high HIV prevalence rates (World Bank 2006a). There is a high dependence on foreign aid, even though aid flows declined considerably in 2000–2004 because the government had not complied with its agreements with donors (World Bank 2006a; WFP 2007). This lack of donor coordination with the Malawi government led to a very slow donor response to the 2001/2002 crisis. A change in government in 2004, coupled with Malawi's receipt of debt relief under the Heavily Indebted Poor Countries (HIPC) initiative in September 2006, will probably lead to aid flows as high as those in the late 1990s.

Vulnerability to droughts in Malawi. Malawi is extremely dependent on one main staple food crop—maize—which accounts for about three-quarters of calorie consumption for Malawi's population. Even though maize is agroecologically well suited to Malawi, smallholder maize production has stagnated in the past decade (Dorward and Kydd 2004). In terms of cash crops, export earnings are dominated by tobacco (61 percent) and tea (9 percent), which are rainfed crops, making Malawi vulnerable to variations in rainfall in addition to commodity price shocks (Clay et al. 2003). Tea earnings are also highly dependent on international prices.

Malawi suffers from "thin markets"—that is, very low traded volumes of key commodities, manufactures, and services (Dorward and Kydd 2004). This situation is due to transportation bottlenecks, high communication costs, and therefore high risk premiums associated with trading. Thus, for Malawi, formal trade with its neighbors was not a viable solution to the food crisis, especially because droughts affected a number of Southern African countries at the same time, causing food prices to skyrocket.

Livelihoods in Malawi are especially vulnerable owing to a combination of factors such as recurrent droughts and floods, increasing population pressure, declining soil fertility, and the country's landlocked geography. The HIV/AIDS pandemic, which has a prevalence rate of approximately 20 percent, is an additional shock to already vulnerable households (UNAIDS 2005). The low levels of financial and physical capital, coupled with the high dependence on agriculture, leave poor people's livelihoods vulnerable to risks of natural shocks such as adverse weather, crop failure, or physical insecurity. According to the World Bank (2003), unsustainable agricultural practices, structural changes in agriculture and economic processes, and institutional weaknesses in agriculture have contributed to the increasing economic instability and vulnerability in Malawi. This vulnerability is compounded by the thin markets (Dorward and Kydd 2004).

Other factors contributing to economic vulnerability include poor governance, inconsistent policies, short-term variability in external aid levels, and the effects of HIV/AIDS on resources (Benson and Clay 2004). These factors deepened the crises in 2001/2002 and 2002/2003, spreading vulnerability even to areas that were not severely affected by the drought and accelerating household impoverishment. Southern Africa is the area of the world most affected by HIV/AIDS, with Botswana, Zambia, and Zimbabwe recording extremely high AIDS mortality rates (De Waal and Whiteside 2003).

Whom do droughts affect and how? Smith (2001), which formed the framework for the World Bank's intervention in Malawi in 2002, argues that the droughts severely affected three vulnerable groups in particular: landless people, female-headed households, and the growing number of orphans.

Food Security and Drought in Zambia

Situating Zambia in Southern Africa. Zambia is also one of the poorest countries in the world. Defined as a least-developed country (LDC) by the World Bank, Zambia was ranked 143rd out of 161 countries in the *2001 Human Development Report.* The HIV prevalence rate was 14.1 percent in 2005 (UNAIDS 2005) contributing to high death rates and a steadily increasing demographic group of orphans (Samatebele 2003).

The country is characterized by a high incidence of poverty and exposure to several types of shocks like HIV/AIDS, macroeconomic instability, and periodic droughts, which have led to severe chronic and transitory food insecurity in the country (Del Ninno et al. 2005). Around 20 percent of households are classified as vulnerable (likely to be poor and exposed to shocks), whereas 40 percent are classified as chronically poor households (poor with low levels of human capital). Ten percent are both vulnerable and chronically poor (Del Ninno and Marini 2005).

Zambia is also dependent on maize as a main staple food crop. The production of maize is highly dependent on rainfall and thus susceptible to droughts. Only 5 percent of total agricultural land is irrigated, and 85 percent of cultivated land is grown with maize (Del Ninno et al. 2005). According to a paper presented at the Southern African Regional Poverty Network (Samatebele 2003), the following factors have compounded food insecurity in the country:

- an erratic supply of fertilizer and seed in the market;
- insufficient, erratic, and poorly distributed rainfall;
- losses of cattle and draught power due to animal diseases like corridor;
- high interest rates caused by structural adjustment programs (SAPs),
- lack of credit facilities for small-scale farmers;
- failure by the government to release funds to the Food Reserve Agency (FRA) to enable it to smooth out shortages and store food from one season to the next;
- high prevalence of HIV/AIDS;
- poor extension services; and
- unsustainable farming practices that have degraded the land.

History of droughts in the country. Along with the rest of Southern Africa, Zambia suffered a severe drought in 1991 and 1992. It was also hit by more localized droughts in its southern and western regions in 1994 and 1995, as well as in 1998, 2001/2002, and 2002/2003 (Del Ninno et al. 2005). According to the WFP (2007), 2.3 million people needed emergency food aid in Zambia owing to erratic rains and prolonged dry spells in 2005/2006. Like Malawi, Zambia's vulnerability to food crises can be attributed to a complex combination of factors such as unfavorable weather patterns, poor health standards, and poor socioeconomic conditions. The 2003 crisis was further compounded by reduced food production in two preceding seasons (2000/2001 and 2001/2002), which resulted in substantial deficits of staple food (Samatebele 2003).

Whom do droughts affect and how? The impacts of droughts are felt most directly by farmers, because of loss of crop production and cattle, and by consumers, because of the higher consumer prices of food commodities in general and of maize in particular (Del Ninno and Marini 2005). The indirect impacts affect certain vulnerable groups such as widows and separated female-headed households, as well as households whose income comes mainly from agriculture and that have a large proportion of area under crop cultivation. Droughts have a large impact on the distribution of consumption of both the poor and nonpoor households in rural areas (Smith 2001).

Productivity in both Malawi and Zambia was low because poor farmers had difficulty getting access to inputs and could not get their goods to markets owing to poor infrastructure. In addition, lack of market integration prevented the transfer of food from food-surplus to food-deficit areas at affordable prices. Food availability declined substantially during drought years. Furthermore, the lack of transparency concerning government policy on commercial imports and sales added to traders' uncertainties and kept private sector imports from stabilizing market prices following major production shortfalls in 2001 and other years (Del Ninno et al. 2005).

Policy Issues

Government Policies

There are conflicting views on the role of the government in agricultural markets. The World Bank and the IMF argue that national and household food security in Malawi and Zambia is best achieved by liberalizing agricultural production and marketing and that the liberalizing reforms have improved market efficiency, reduced budget deficits, stimulated export production, and increased the share of the final price received by farmers. On the other hand, critics of liberalization argue it has exacerbated household food insecurity by destabilizing agricultural prices, widening the income distribution gap, and reducing access to low-cost inputs; they call for more government intervention to help poor households manage risk (Kherallah et al. 2002). One of the direct impacts of the liberalization reforms was a reduction in fertilizer subsidies and state enterprises that monopolize fertilizer distribution. Fertilizer markets are, however, still subject to target distribution programs, indirect subsidies, and other forms of intervention (Kherallah et al. 2002).

Malawi. From the early 1960s to the early 1990s, Malawi set up a system of monopolistic marketing parastatals and promoted government policies to fix exchange rates and control agricultural markets in order to stabilize prices and reduce risks for farmers. ADMARC, the agricultural marketing parastatal, was fairly effective and played an integral role in containing the 1991/1992 drought by making food from its depots available to people at affordable prices (Devereux 2002b). ADMARC's long-run sustainability was undermined by its maize subsidization policies, which were difficult to finance. By the late 1980s the parastatal was deemed unsustainable because of its growing fiscal demands on the government, and under pressure from the IMF, the government started liberalizing the agricultural sector. The vulnerable "transition" period between ADMARC-controlled agricultural marketing and full liberalization contributed to the lack of livelihood security for many Malawians during the 2001/2002 crisis. According to a number of critics, the economic austerity measures called for by structural adjustment, including removal of input and consumer subsidies that the Malawi government had introduced in the mid-1990s, compounded food insecurity in the country (Devereux 2002b).

A controversial issue that led to a souring of relations between the government and donors during the 2001/2002 crisis was the selling of the strategic grain reserves. In 2001 the IMF had suggested that the government sell some of its grain reserves to pay back debt it owed the IMF. Instead, the entire stock of grain reserves was sold, and by the time the food crisis struck, there was no grain to release to the people. What happened to the grain is still a mystery. Unconfirmed allegations claim that politically connected people bought the grain and then released it at high prices during the crisis, thus gaining financially from food insecurity in the country. Questions about why the stock was sold and to whom aggravated donors, leading the IMF to withhold balance of payments support; DFID, the European Union (EU), and the U.S. Agency for International Development (USAID) suspended development assistance, and Denmark withdrew completely from Malawi (Devereux 2002b).

The 2001/2002 disaster, however, improved the government's responses to the disasters that followed. With the support of international donors, the government implemented the Targeted Inputs Programme whereby smallholder farmers are provided with a tiny pack of free inputs (fertilizer, maize seed, and legume seed). The program was expanded to near-universal coverage in early 2002 following the serious food crisis. Originally called the Starter Pack Programme, it had had universal coverage in 1998/1999 and 1999/2000 but was then scaled down and targeted to the poorest smallholders. The Malawi Starter Pack, later called the Targeted Inputs Programme, failed to kick-start agricultural growth, yet it succeeded in overcoming the severe input constraints facing smallholder farmers. At a sufficient geographical scale, it can help combat chronic food insecurity by enabling poor farmers to grow their own food, thus keeping food prices low during the hungry season. It also contributes to social protection and is a less expensive option than fertilizer price subsidies, subsidized commercial food imports, or food aid (Levy et al. 2004).

Targeted fertilizer subsidies are another program the government introduced to deal with food insecurity. The current program provides a majority of households with vouchers enabling recipients to buy fertilizer at one-third the market cost. Initial findings show that these programs are costly, difficult to sustain, ineffective at targeting poor farmers, subject to rent seeking, and harmful to the

development of sustainable input delivery systems. Subsidies are only useful when they produce significant productivity gains, when they are less costly than alternatives such as food aid, and when they are designed in a way that avoids negative impacts on private markets (Crawford et al. 2005).

To tackle the 2005/2006 crisis, the Government of Malawi committed its budgetary resources to an emergency assistance program and purchased seed and fertilizer for targeted distribution to smallholder maize farmers at subsidized rates. It also launched a "Feed the Nation Fund" program for quick access to resources during an emergency (CAP 2005). The UN lauded its efforts and sent out an appeal in 2005 for US$87.8 million to support the government's two-pronged approach to the food crisis.

Zambia. Overall, food production in Zambia has declined substantially since 1990. This decline is mainly due to the withdrawal of government subsidies on inputs and an end to pricing policies that had favored maize production at the expense of other agricultural commodities. The government had implemented these policies in the mid-1960s and phased them out in mid-1990s under pressure from the IMF and in its move toward economic liberalization (Del Ninno et al. 2005).

In spite of liberalization, the government continued to intervene in food markets by establishing the Food Reserve Agency (FRA) in 1995. The FRA was meant to purchase and manage maize for the national food reserve and to collect and disseminate marketing and trade information. The Crop Marketing Authority (CMA) replaced the FRA in 2003 with a mandate to promote markets and to maintain enough strategic reserve stocks to ensure market supplies for three months. Nijhoff et al. (2003) argue, however, that government stocks may be redundant and may even destabilize markets by discouraging private stockholding and imports.

The Zambian government has attempted to increase food supplies through a combination of government commercial imports, food aid, food and cash transfer programs, and private sector imports (and ban on exports) (Del Ninno et al. 2005). Yet according to World Bank (2003), the government has taken limited action to anticipate shocks and design the proper response (Del Ninno and Marini 2005).

Programs and Policies of Nongovernmental and Intergovernmental Bodies

Malawi. In 1998, under the leadership of the World Bank, a joint government-donor group on safety nets was convened (Smith 2001). It was coordinated by the government's National Economic Council (NEC) and had financial backing from several donors including DFID, the EU, WFP, and the United Nations Development Programme (UNDP). The National Safety Net Programme, as it was termed, dealt with a number of issues, including the identification and selection of target groups, selection of appropriate instruments and benefit levels, fiscal affordability and sustainability, and a suitable "exit strategy" to avoid creating dependency (Devereux 2002a).

Smith (2001) said that Malawi typifies the problem of providing a safety net in very low-income countries because (1) a large proportion of the population is absolutely poor, with incomes around the subsistence minimum, and is prone to severe shocks such as droughts and AIDS; (2) growth is not rapid enough; (3) with such a large proportion of the population in poverty and little surplus to redistribute, it is unclear what role safety net transfers should play; (4) the database is weak, making it difficult to identify and target the poorest; (5) there is limited administrative capacity, making it difficult to manage complex programs; and (6) although there is no formal safety net program, a lot is already spent on transfers under various ad hoc donor initiatives but with very little impact on poverty.

Devereux (2002a, 2) criticized the National Safety Net Programme as "a product of a technocratized yet ideologically driven team of expatriate 'experts,' working in a vacuum with nominal consultation and only token attempts at building a consensus among government agencies and other national stakeholders." There is no doubt that the program had its failings, as shown by the critical food shortages and hunger-related deaths in rural areas following floods in the south and a drought in central districts in early 2002. This result underlines the importance of instituting safety net programs that factor in possible future disasters instead of merely dealing with the consequences of the current crisis.

In 2006 a number of agencies were still in Malawi, working on the food insecurity rampant in the country. For example, Oxfam (2006) said it was working with WFP in southern Malawi, providing

food aid to 350,000 people. Oxfam had also launched a pilot scheme of emergency cash transfers, as an alternative to food aid, for 22,000 people in Thyolo district. In 2005 the World Bank contributed US$30 million to the Malawi government to import food. The WFP sought to increase food security among the rural and urban poor in Malawi through the creation and rehabilitation of community and household assets in food insecure areas (WFP 2007), primarily through its Food for Assets and Development Program. In this program the WFP distributes family food rations to participants (mainly smallholder farmers) who participate in its asset-building programs, which include building or rehabilitating irrigation schemes, roads, drainage systems, and other infrastructure. Other agencies that are combating food insecurity generated by the Malawi food crisis of 2005/2006 include Action against Hunger, Concern Worldwide, UNICEF, and Action Aid (CAP 2005).

Zambia. The Zambian government declared a disaster in May 2001. In response, UNICEF, the UNDP, the WFP, the Food and Agriculture Organization of the United Nations (FAO), and the World Health Organization (WHO) produced the UN Emergency Consolidated Appeal (CAP), requesting funding of US$71.39 million for emergency food assistance. The assistance targeted 1.7 million beneficiaries and had a distribution target of 224,000 metric tons (MT) of relief food. Beginning in August 2002 the Zambian government, in collaboration with the WFP and other UN systems, began the Emergency Operation Programme (EMOP), which included the distribution of food and nonfood items to 43 affected districts (Samatebele 2003).

Because of limited information on the demography and problems of vulnerable households, however, it was difficult to reach the people who were most in need. Furthermore, the government refused the genetically modified maize brought into the country by the WFP, increasing the need to prioritize the groups that were the most vulnerable. Only 11 percent of the planned relief requirements were received by December 2002 (Samatebele 2003). In 2006, according to information released by the national Vulnerability Assessment Committee, Zambia's agricultural season was generally good even though in some regions excessive rains limited crop production (WFP 2006).

The Role of Food Aid

Food aid in general has been the subject of much criticism. Some of the critiques include lack of timelines and high cost of delivery to the recipient country (Barrett and Maxwell 2005 as quoted in Gentilini 2007), high administrative costs within countries, and leakages in the distribution of food aid (Smith and Subbarao 2003 as quoted in Gentilini 2007). It has also been blamed for causing disincentives for domestic production because it reduces domestic prices and can lead to reduced public and private investment in food production. Thus, the benefits of food aid in addressing acute short-term food insecurity may be offset by the cost of reducing long-term food security (Del Ninno et al. 2005). One criticism of the response to the 2002/2003 crises was an overemphasis on food aid, which Witteveen (2006) said is a "blunt tool" inadequate to respond to complex crises such as the 2001/2002 Southern African crisis.

There is also an ongoing debate on food versus cash transfers, primarily concerning whether cash and food transfers are alternative or complementary, and in which circumstances they should be adopted (Gentilini 2007). In a 2006 regional workshop on cash transfers in Southern Africa, Stephen Devereux argued that food entitlements can leave people vulnerable to failures in four main areas: production, labor markets, commodity markets, and informal transfers (RHVP 2007b). These vulnerabilities have led to a recent push from donors toward cash transfers, often in lieu of food transfers. The rapidly rising popularity of cash transfers in both emergency and development contexts has raised a number of political, financial, and operational challenges for governments, donors, and nongovernmental organizations (NGOs) (Farrington and Slater 2006).

In 2005/2006 Oxfam designed cash transfer pilot programs that provided 13,500 and 6,000 households in Zambia and Malawi respectively with a monthly disbursement of cash. One of the objectives of the pilot programs was to explore alternatives to food aid. An independent evaluation carried out by the Overseas Development Institute (ODI) in April 2006 found that unconditional cash transfers can be an appropriate response to acute food insecurity in certain contexts, but rigorous monitoring and flexibility in the planning and availability of resources are crucial. Additionally, agencies cannot assume that cash transfers will be more cost-effective, particularly in remote areas with weak markets (Witteveen 2006).

Malawi. Because of the souring of donor-government relations, especially over the issue of the sale of the strategic grain reserve, donors were slow to respond to the 2001/2002 crisis, and the food aid, though unconditional, arrived very late. The consequences of this delay were severe, including malnutrition and death for tens of thousands of Malawians.

The Government of Malawi had requested donor assistance in August 2001, citing a possible food crisis, but donors did not respond. In November 2001 several major donors—including Denmark, the EU, the United Kingdom, and the United States—suspended their aid programs in Malawi in protest against alleged corruption and economic mismanagement by the Malawi government.

There have been two main explanations for this delayed reaction from the donors. The first is that the donors did not have adequate information on the scale of the disaster and did not believe that a famine was actually underway. The second explanation points to the poor relations between the Malawi government and the donors that made them hesitant to extend support during the drought crisis (Devereux 2002b).

Even after donors started sending food aid to Malawi, the relationship between the government and the donors remained strained. In mid-May 2002 the IMF suspended disbursement of US$47 million in loans to Malawi owing to overspending by the government and blamed the government for having created famine conditions that led to the 2001/2002 crisis (Devereux 2002a).

Nonetheless, the crisis of 2001/2002 mobilized donors and the government to better prepare for future droughts. The Malawi government launched appeals for food aid in January and February 2002, and a number of countries and international agencies responded. Also in February 2002, the government set up a Task Force on the Food Crisis through which donors, NGOs, and the government could work together to combat food insecurity.

Zambia. Zambia's urban maize flour subsidies in the 1980s were untargeted and involved unsustainably large fiscal subsidies, and in the early 1990s the government eliminated them. This policy change has led to a substantial decline in food production since 1990, owing largely to the withdrawal of subsidies on inputs and an end to pricing policies that had favored maize production at the expense of other agricultural commodities. Thus Zambia has relied on food aid, supplemented by government commercial imports, to address major drought-related maize production declines.

Food aid programs were the main safety net in Zambia and in Southern Africa after the mid-1990s. Food aid included food transfers, food for assets, school feeding programs, supplementary feeding, and support to HIV/AIDS-affected households. Food-for-cash and cash-for-work programs were also implemented after the 1995 crisis. Food aid, both to provide short-term emergency relief and to help address medium-term food deficits, is thus often a major component of food security strategies in Zambia (Haddad and Frankenberger 2003).

At the end of these food aid programs, however, argues Devereux (2000), these areas suffered massive economic recession (as quoted in Del Ninno et al. 2005). He suggests that Zambia may have become dependent on food aid in the 1990s; between 1990 and 1995, in response to several droughts, certain areas in western Zambia received food aid in four out of five years. Devereux (2000) further argues that substantial sales of food aid show that the quantities distributed were too large, arrived too late, and were poorly targeted (Del Ninno et al. 2005).

The drought recovery project implemented after the 2001 crisis focused on implementing safety net interventions, mostly public works and agricultural input subsidies, instead of just supplying food aid. In 2002 the Zambian government appealed for humanitarian aid. The National Vulnerability Assessment Committee then initiated a series of food security assessments in August and December 2002 and April 2003 in order to identify needs and determine food aid distribution priorities within the country. Food aid continued to move into the country, and Zambia received a total of 176,000 MT of food aid from 2000/2001 to 2002/2003. Still, per capita food availability fell.

The Role of Trade

There is great scope for using informal cross-border trade in the Southern African region to meet food needs in Zambia and Malawi because agroecological and climatological variations ensure that there is usually good production in at least some parts of the region (Mano et al. 2003). Both Malawi and Zambia are landlocked countries that

trade extensively with their Southern African neighbors, especially the Democratic Republic of the Congo (DRC), South Africa, and Zimbabwe. Importing food has been seen as a high-cost approach to ensuring food availability in Malawi given that official maize imports are estimated to cost up to five times as much as domestically produced maize (Levy 2003 as quoted in Cromwell and Kyegombe 2005). Yet, through cross-border trade, moving cereals from surplus-producing areas like northern Mozambique to deficit areas in Malawi and Zambia is a viable option to meet the food needs in those countries (Mano et al. 2003). In 2001/2002 and 2002/2003 informal trade between Malawi and Mozambique was estimated to have accounted for between one-third and one-half of total maize imports (Cromwell and Kyegombe 2005). Various regional trade agreements and forums have been set up recently to encourage cross-border trade, and there is a particular focus on the Malawi-Zambia-Mozambique trading triangle.

A new food security instrument being considered for the Southern African grain markets is the use of futures contracts. The reasoning for this is as follows: in 1998 and 2002 the governments of Malawi and Zambia imported grains at high prices; at the same time, the South African Futures Exchange (SAFEX) saw a steady increase in maize trading volumes, which suggested the possibility of hedging regional import requirements (Dana et al. 2006). The study by Dana et al. (2006) showed that the Malawian and Zambian maize prices generally move closely together, are very volatile, and were exceptionally high during 2001/2002, both absolutely and relative to world and regional levels. The 2001/2002 crisis resulted in regional shortfalls that drove up South African prices relative to the world market. Thus, Malawi and Zambia were twice affected; first by the increased differential relative to South Africa, and second by the increase in the South African differential relative to the world market (Dana et al. 2006).

In the 2005/2006 agricultural season, final food estimates showed that Malawi would face a food gap of about 400,000 MT. In response, the government signed an options contract with the Standard Bank of South Africa in 2005, giving it the right to buy additional maize at a price fixed at the time that the contract was signed (up to a maximum of 60,000 MT at US$18 million), which is enough to meet the food gap if commercial and donor imports are not high enough. So far, the experience has been positive—most of the maize purchased was used to meet humanitarian needs and had the best delivery performance of all the maize imported into Malawi (Slater and Dana 2006). In addition, by the time of delivery in December 2005 and January 2006, prices had risen to between US$50 and US$90 above the ceiling price of the contract, showing that without the options contract, Malawi would have paid much more to secure the same amount of maize. Options contracts have the potential to make humanitarian agencies more efficient (by improving the value of every food aid dollar), more effective (by mitigating price risks and thereby reducing the overall levels of humanitarian need), and more supportive of local trade (by focusing on risk management roles instead of trading functions) (Slater and Dana 2006).

Stakeholders

The groups that form the stakeholders are common to Malawi and Zambia. They represent vulnerable households, farmers, the national governments, and external donors. This section outlines the role of each group of stakeholders, how they were affected by the famine, and how they affected it.

Citizens

The farmers are directly affected by the droughts because they suffer from loss of crop production and cattle, leading to loss of incomes and purchasing power. Because both Malawi and Zambia rely heavily on agriculture, droughts adversely affect the whole economy, and the approximately 70 percent of people directly involved in agriculture face livelihood shocks and food and economic crises. Consumers are affected through the higher consumer prices of food commodities in general and of maize in particular.

The consequences of droughts include shocks to household livelihoods, with reduced incomes leading to increasing levels of poverty and increases in staple food prices. This combination of reduced incomes and higher food prices made it difficult for people to buy food, resulting in deep food insecurity. The food crisis was exacerbated by political problems such as donor-government tensions and government corruption, as well as by the AIDS epidemic, which decimated agricultural labor. People's coping methods include dietary changes such as reducing the amount eaten at

meals, or skipping meals altogether, which leads to increasing levels of malnutrition and deteriorating public health (Samatebele 2003).

Civil society groups, especially in Malawi, are strongly engaged in the struggle against food insecurity. A number of Malawian civil society organizations are campaigning for "food justice" and "the right to food." For example, the Malawi Civil Society Agriculture Network "promotes sustainable livelihoods for the rural poor by influencing policy, practices, attitudes of the government, donors, and civil society through advocacy and networking" (see http://www.cisanet.org/AboutUs/Aboutus.htm). Similarly, the Malawi Economic Justice Network is a coalition of civil society organizations committed to poverty reduction through partnerships that ensure that government policies and actions are of direct benefit to the poor (see http://www.mejn.mw/aim.html).

National and State Governments

In Malawi, before the joint government-donor National Safety Net Programme, the government had implemented some smaller programs to address severe food insecurity. The National Safety Net Programme was the first national-level response to the crisis. Devereux (2002a) argues that the government's limited fiscal base does not allow it to implement either development programs or safety nets and that therefore it has very little leverage or bargaining power with its "development partners."

In Zambia the government has attempted to increase food security through a number of measures, including government commercial imports, food aid, private sector imports, and food and cash transfer programs. After the Zambian government declared a food crisis and appealed for humanitarian aid in 2002, the National Vulnerability Assessment Committee carried out food security assessments in 2002 and 2003 to identify needs and inform food aid distribution priorities within the country.

Donors and International Organizations

Zambia had faced two consecutive disasters: the 2000/2001 drought reduced crop yields by almost 40 percent of the anticipated harvest, and 2001/2002 also brought a production deficit. The Zambian government declared a disaster in May 2001 and, shortly after, the Government of Malawi declared a state of national disaster in February 2002 because of widespread famine and the mounting toll of hunger-related deaths. Both governments appealed to the international donor community and to various UN agencies for assistance.

There was a concerted response by the international donor and humanitarian community to the Southern African crisis in 2001/2002. The United Nations, through "Consolidated Inter-Agency Appeals in Response to the Humanitarian Crisis in Southern Africa," called upon the donor community for more than US$600 million to support a multisectoral approach in responding to the Southern African crisis. The WFP, which took the lead on providing food aid, launched two successive regional emergency operations (EMOPs), and generous donor response enabled it to provide emergency food aid to 10 million people between July 2002 and June 2004 (WFP 2007). Many NGOs also responded to the crisis, including CARE, Africare, Malawi Red Cross, Catholic Relief Services (CRS), Save the Children, World Vision, and Concern Universal.

Policy Options

Some of the issues to be addressed with regard to the food crises in Malawi and Zambia include strategic grain reserves, trade, social protection programs, innovative government programs, and the role of food aid.

Food Reserves

In both Malawi and Zambia, authorities failed to ensure that there were sufficient food reserves to mitigate food shortages. Although food reserves are now acknowledged as central to ensuring food security, there is still no agreement about how much should be stored. Most opinions tend to vary between 60,000 and 180,000 MT, with local governments arguing for larger reserves and many donors arguing for less (Devereux 2002a).

Informal Cross-Border Trade

Because both Malawi and Zambia are landlocked countries, it is difficult for them to gain access to food quickly. Price rises, combined with transportation delays, make these countries extremely vulnerable to price and supply fluctuations in external markets. It costs up to five times more to import maize than to produce it. During the 2001/2002

food crisis, formal trade could not have worked as a means to meet food needs because maize prices rose owing to a general regional shortage, which was compounded by price hikes and communication and transportation costs. Informal cross-border trade, however, is a potential way to address maize supply shortages in Malawi and Zambia, especially from food-surplus areas like northern Mozambique to food-deficit areas like southern Malawi and parts of Zambia. For informal trade to be successful in combating food insecurity, however, both governments must implement policies and programs that reduce the cost of trade (Arlindo and Tschirley 2003). Initiatives such as regional trade forums and agreements are steps toward ensuring that the advantages of cross-border informal trade can be fully realized in future drought situations in the region.

Social Protection Programs

The National Safety Net Programme was the first attempt by policymakers in Malawi to provide a comprehensive package of social protection measures for poor and vulnerable Malawians. The three objectives were (1) increasing lean season consumption of the poorest 20 percent, (2) providing direct assistance to those unable to look after themselves, and (3) providing increased coverage during adverse economic events or shocks such as droughts.

One criticism of existing safety nets in these countries is that they are an unsustainable response to structural problems like AIDS or rural landlessness because consumption transfers, food aid, and seasonal public works do not solve crises of low production or address issues of landlessness. Yet because of their visibility and clear targets, they are often kept in place while more sustainable poverty reduction measures are delayed.

Malawi and Zambia currently implement cash transfers and food aid programs, which usually target the most vulnerable and poorest households affected by food insecurity. These controversial programs often have conflicting results. Both Malawi and Zambia will be interesting case studies of the cash versus food debate, with their history of food aid interventions in juxtaposition with an increasing number of visible and well-funded cash transfer programs in recent years. Devereux (2002a) argues that a dangerous cycle of food aid dependency has developed in Malawi since 2001/2002. This argument is also partially true of Zambia, given that recurrent droughts have forced the government to rely on external food aid to combat food insecurity. Yet agencies like DFID, USAID, and the WFP claim that there are very few alternatives to food aid, especially as an immediate response to an emergency food crisis.

Other examples of recent targeted programs in Malawi include the Targeted Inputs Programme for smallholder farmers and targeted fertilizer subsidies. The Targeted Inputs Programme has been relatively successful, but the fertilizer subsidies have proved to be very expensive and not successfully targeted to those who need them. Targeted interventions work only when the most vulnerable benefit from the programs and should be adopted only when they are less expensive than other food insecurity instruments like food aid and commercial imports.

Innovative Initiatives

Given the nature of the recurrent droughts and food crises in Malawi and Zambia, innovative means of addressing deep-rooted food insecurity in the countries are needed. Two such methods are (1) the futures market, such as the options contract piloted by the Government of Malawi, which has shown initial positive results, and (2) improving informal cross-border trade between countries like Malawi and Mozambique so that during food shortages even landlocked countries like Malawi and Zambia will have access to less expensive food.

A Global Contingency Fund

There is a lot of research on the issue of whether relief comes at the cost of long-term development. In a report to the World Bank, the Independent Evaluation Group said that it is critical that disasters be calculated as part of development since some countries are in a near-permanent state of recovery (IEG 2006). Malawi and Zambia are both losing sight of the long-term priorities of mitigating and managing disaster risk as they concentrate on the short-term goal of reacting to an emergency.

The IEG (2006) also mentioned a proposal to expand an existing UN program to provide a global contingency funding mechanism. Global strategies like this mechanism are crucial given that one of the problems of emergency drought relief is that a delay between the crisis and the mobilization of resources and food can lead to deaths and can have detrimental side effects on long-term development.

Assignment

As an official of an international development assistance agency, your assignment is to design a strategy that will assist Malawi and Zambia in coping with the combined risks of food insecurity, drought, and HIV/AIDS.

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Chapter Fourteen
Famine and Food Insecurity in Ethiopia (7-4)
by Joachim von Braun and Tolulope Olofinbiyi

Executive Summary

Ethiopia, the second most populous country in Sub-Saharan Africa, is home to about 75 million people. The country has a tropical monsoon climate characterized by wide topographic-induced variations. With rainfall highly erratic, Ethiopia is usually at a high risk for droughts as well as intra-seasonal dry spells. The majority of the population depends on agriculture as the primary source of livelihood, and the sector is dominated by small-holder agriculture. These small farmers rely on traditional technologies and produce primarily for consumption.

Famine vulnerability is high in Ethiopia. With the rapid population growth of the past two decades, per capita food grain production has declined. Cereals constitute the largest share of food production in the country. Today, with recurrent famine threats, food aid is an important source of cereal supply.

Additionally, agricultural market dysfunctions are common in Ethiopia. Throughout history, the state has controlled the markets. With the enactment of a major market reform in the 1990s, the country saw some progress. Markets remain thin, however, with wide price spreads and volatility.

In 2002, despite good harvests in the previous years, Ethiopia was hit by another famine: Production was insufficient, and food did not flow from surplus to deficit areas. Apart from population pressure, the causes of this crisis include production, market, policy, institutional, and organizational failures.

Each time a food crisis occurs, there is a complex interaction of supply, distribution, and demand factors. It is these processes at work on national and household levels that determine outcomes for food security, food availability, access, and use.

Because the causes of famine are multifaceted, multiple actions are required to prevent its occurrence. On a broader level, two points must be emphasized. First, specific programs alone cannot effectively tackle famine. Micro-level interventions should be considered in tandem with macro-economic policies. Second, market integration and price stabilization must be in place for individual projects to function effectively. The question of policy and program choice and sequencing arise in determining the optimal program mix for mitigating and preventing famine. But how is such a program mix determined under resource and time constraints?

Your assignment is to recommend a set of short- and long-term policies and programs to improve food security in Ethiopia that will be compatible with available government resources and reductions of Ethiopia's dependence on foreign food aid.

Background

Geography

Ethiopia, the second most populous country in Sub-Saharan Africa, is home to about 75 million people. Located in the northeastern part of the Horn of Africa, Ethiopia is landlocked and shares boundaries with Djibouti, Eritrea, Kenya, Somalia, and Sudan. The country has a tropical monsoon climate characterized by wide topographic-induced variations. With rainfall highly erratic, Ethiopia is usually at a high risk of annual droughts as well as intraseasonal dry spells (FAO 2005; World Bank 2007; CIA 2007).

Economy

As one of the poorest countries in the world, Ethiopia has a per capita gross domestic product (GDP) of US$160—no more than a fifth of the Sub-Saharan African average. The majority of the population lives in the rural areas and depends on agriculture as their primary source of livelihood. The sector accounts for almost 47 percent of GDP, 60 percent of exports, and 80 percent of employment. The main agricultural products include

cereals, pulses, oilseeds, coffee, potatoes, sugarcane, cut flowers, fish, and livestock. Coffee is the main export commodity, with total exports of about US$350 million in 2006. The agricultural sector is dominated by smallholder agriculture. Most small farmers rely on traditional technologies and produce primarily for consumption (Kuma 2002; Gabre-Madhin and Mezgebou 2006; World Bank 2007; CIA 2007).

Famine in Ethiopia

Ethiopia has a history of famine[1]: Between 1983 and 1985, the country experienced the worst famine in current history, with a series of rain failures and substantial livestock loss. About 8 million Ethiopians were affected, and 1 million were estimated to have died. The famine also had longer-term effects in that many of the poor had depleted their assets to deal with the famine, which left them even more vulnerable to future crises. Famine vulnerability continued through the mid-1990s owing to conflict in the northern regions and protracted drought in other regions of the country (Webb and von Braun 1994).

In 2002 Ethiopia was hit by another famine, despite good harvests in 2000/2001 and 2001/2002. Grain prices fell below the historic average. Maize prices in surplus regions fell by almost 80 percent. Although reduced prices favored the rural and urban poor, it created a disincentive for input use by producers. By late 2002 the increase in production and the lower prices were not sufficient to combat the chronic food insecurity that affected the majority of poor households; the number of people in dire need of food had more than doubled (Kuma 2002; Gabre-Madhin 2003).

About 6 million people were in need of urgent food aid, and 15 million faced the threat of starvation. Unable to supply adequate food to keep people alive, the Government of Ethiopia reached out to the international community for assistance. In the words of Ethiopia's Prime Minister, Meles Zenawi, "Even if we had the food available in the domestic market, the government doesn't have the money to buy this surplus food for redistribution" (BBC 2002). In January 2003 there was an actual decline of 21 percent in production and a 27 percent decrease in seed and fertilizer use, leading to an 85 percent price increase compared with 2002 (Gabre-Madhin 2003).

Food Grain Production Trends

With the rapid population growth of the past two decades, per capita food grain production has declined. Cereals constitute the largest share (about 88 percent) of crop production in Ethiopia. Five major food grains—*teff*, maize, sorghum, wheat, and barley—make up 95 percent of total production. With limited irrigation use, food grain production is almost entirely dependent on rainfall. Production is characterized by extreme variability in area cultivated and volume of output. In the past decade, although certain areas of the country experienced significant gains in yield, the country overall has experienced limited gains in crop yields. Owing to the dependency on rain-fed agriculture, yield variability is highest for wheat, sorghum, and maize (Gabre-Madhin 2001; Kuma 2002; Gabre-Madhin and Mezgebou 2006; Rashid et al. 2006).

Food Aid Trends

Food aid is an important source of cereal supply in Ethiopia: Between 1995 and 2004, cereals accounted for 95 percent of food aid flows. About 74 percent was food aid imported from donor countries, whereas local purchases accounted for approximately 19 percent. Seventy-eight percent of total food aid inflows entered during emergencies. The influx of food aid has attracted much criticism because it may create disincentive effects on local production in the form of declining producer prices and government incentives to invest in productivity-enhancing technology and policy reforms. Although food aid is controversial, many studies have found no evidence of disincentive effects on local production and prices in Ethiopia (del Ninno et al. 2007).

Agricultural Markets and Politics in Ethiopia

Throughout history, Ethiopian governments have been heavily involved in agricultural markets. In the mid-1950s the government controlled international trade through state-owned enterprises (SOEs) and discouraged the acquisition of property rights through extensive state ownership of land. The Dergue regime in the mid-1970s prohibited private ownership of landholdings of more than 10

[1] According to Webb and von Braun (1994), "Famine is a catastrophic disruption of society as manifested in a cumulative failure of production, distribution, and consumption systems" (p. 11). It is the exact opposite of food security, which can be defined as "access by all people at all times to the food required for them to lead a healthy and productive life" (p. 12).

hectares, eliminated rural wage labor, and set production quotas and prices. The government controlled grain trade through an SOE, the Agricultural Marketing Corporation (AMC). The AMC set official prices below producer costs, thereby generating producer losses. Producers were required to deliver a fixed quota of grains for military and urban consumption. Private sector trade was barred in major producing regions, and traders in other regions had to supply 50–100 percent of grain turnovers to the AMC at prices below the market level. The AMC also administered food ration shops (Gabre-Madhin 2001; Rashid et al. 2006).

In 1990, under pressure from the international donor community, Ethiopia enacted a radical and sudden market reform. Restrictions on private interregional trade, officially fixed prices, compulsory delivery quotas, and grain rationing were abolished. The AMC, renamed the Ethiopian Grain Trade Enterprise (EGTE), was transformed into a buffer stock scheme. In 1991, at the demise of the Dergue regime, the Transitional Government of Ethiopia took office with the goal of replacing the centrally planned economy with a market-oriented economic system. In 1995 the Ethiopian People's Revolutionary Democratic Front (EPRDF) government came into power. The EPRDF favored a liberal approach, devalued the Ethiopian currency, and implemented various phases of the structural adjustment program[2] as well as other measures necessary for macroeconomic stability. The government also committed to improving the performance of the agricultural sector and ensuring food security (Gabre-Madhin 2001; Kuma 2002; Rashid et al. 2006).

The withdrawal of state control from agricultural markets in the 1990s was a boost to crop production. Prices increased in surplus markets and decreased in deficit markets. Consequently, there was a reduction in price spreads—that is, the price differences between surplus and deficit areas—but the volatility of price spreads remained high.[3] In 1999 more reforms were undertaken with the merger between EGTE and the Ethiopian Oil Seeds and Pulses Export Corporation (EOPEC). The new parastatal had the main objective of exporting grains for commercial profitability rather than stabilizing grain prices. No government unit has been assigned the role of stabilizing market prices (Gabre-Madhin 2001; Gabre-Madhin and Mezgebou 2006).

Policy Issues

Each time a food crisis occurs, there is a complex interaction of supply, distribution, and demand factors. It is these processes at work on national and household levels that determine outcomes for food security, food availability, access, and use. Although production and market failures are recognized as root causes of famine, policy, institutional, and organizational failures also play important roles (Webb et al. 1992; Webb and von Braun 1994; von Braun et al. 1998). Figure 1 is a summary of the interactions in famines.

Despite the major market liberalization in Ethiopia and food surpluses in recent years, food availability remains at low levels and food insecurity persists. Markets remain thin, with high price spreads and volatility. Why was plenty not enough? What happened to the 2002 surplus? Why is the flow of food from surplus to deficit areas limited? Why are prices still volatile? These questions raise a number of issues, including that of market dysfunction in agriculture.

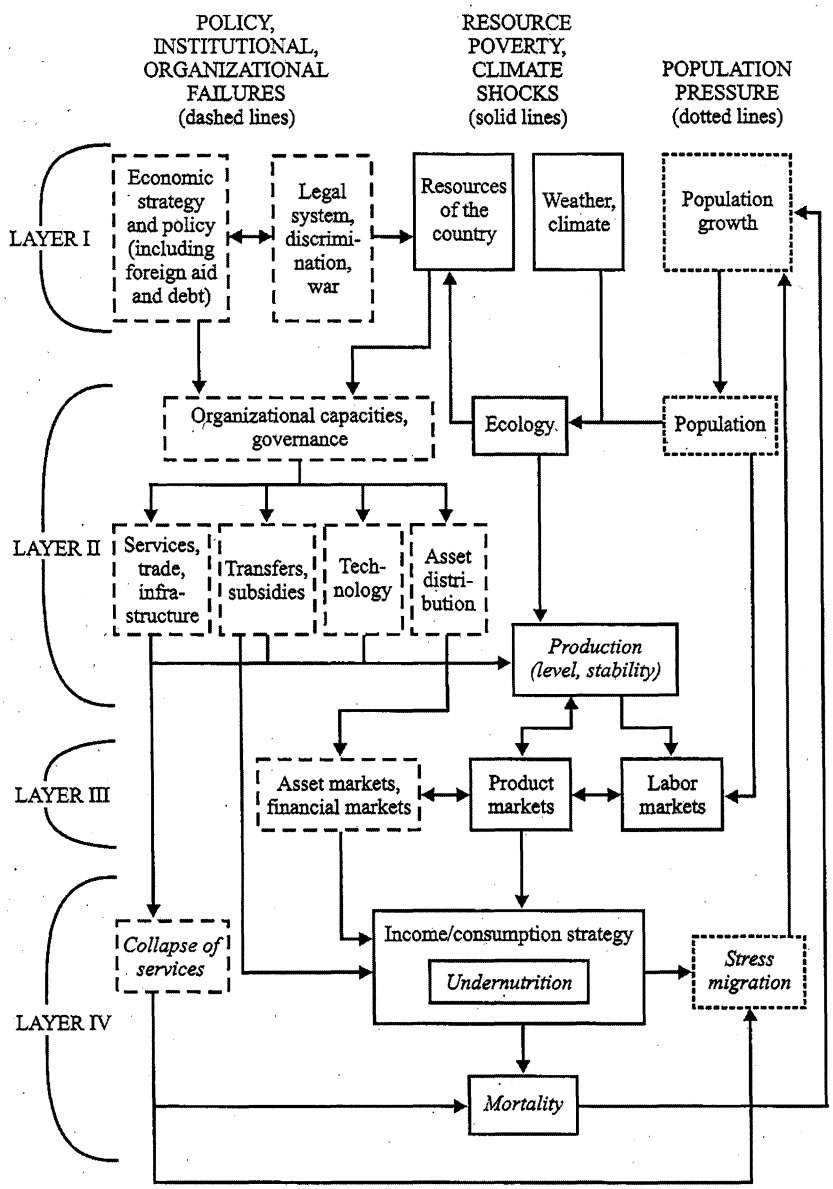
Production Failures: Water and Land Management

Agriculture is the main water-consuming sector in Ethiopia. Despite the country's endowment of water resources, the notable potential of Ethiopia's surface water remains untapped. Although the Government of Ethiopia (GOE) has not been

[2] Structural adjustment programs are economic policies for developing countries that have been promoted by the World Bank and International Monetary Fund (IMF) since the early 1980s through the provision of loans conditional on the adoption of such policies (WHO 2007).

[3] Although favorable weather can explain the shift in price levels, it cannot explain the concurrent price increases in surplus areas and decreases in deficit areas. Other reasons suggested for the decrease in price spreads include lower transaction costs, the end of civil war and trade disruption in the northern regions, the termination of the activities of the former monopoly, and the fact that traders did not have to sell at below-market prices (Gabre-Madhin 2001).

Figure 1: Determinants of and Relationships in Famines



Source: von Braun et al. 1998.

proactive about the development and protection of large wetlands, external initiatives have emerged. Based on water and land availability, technology, and finance, Ethiopia's irrigation potential is estimated at approximately 2.7 million hectares. As of 2001, only 11 percent of this potential had been exploited. Current irrigation projects are categorized as traditional, modern small-scale, modern private, and public.[4] An assessment of small-scale irrigation projects revealed that some projects operated below full potential whereas others were nonfunctional. Reasons include water shortage, damaged structures, and poor water management (FAO 2005).

Ethiopian highlands suffer from degradation, a major threat to current and future food production. Soil erosion by rainwater is one of the main causes. Other causes include physical, socioeconomic, and political factors and poor land policies. On average, soil erosion causes soil loss of about 42 tons per hectare per year on arable lands and an annual reduction of 4 millimeters in soil depth. Soil infertility due to erosion has adversely affected agricultural productivity. By 2010, with the current pace of soil removal and loss, soil erosion is expected to reduce per capita income in the highlands by approximately 30 percent. Although the GOE and international donors have recognized the threat of rapid land degradation, previous soil and water conservation efforts have not been very successful (Bewket and Sterk 2002; Aklilu and de Graaff 2006).

Farmlands in the highlands are small. According to a national study, the average farm size is about one hectare. As specified by the Ethiopian Constitution, the government remains the only landowner, and local governments are required to adhere to this statute in the design of land reforms. Thus, the GOE holds land tenure rights, and land sales and mortgages are outlawed. Nevertheless, the growing land rental market is a notable outcome of the recent land reforms implemented by local governments. Land transfer between users is often informal and nontransparent. As such, the land lease market lacks clear rules and regulations that ensure transparency and security of land transactions, and farmers lack confidence in the ability of government agencies to enforce contracts (Negatu 2005; Pender et al. 2006).

Market Failures

The segmented and uncompetitive nature of Ethiopian agricultural output markets leads to high fluctuations in grain prices. Small farmers, unable to store grain because of low storage capacity, receive very low prices. And although storage capacity increased after the market reforms, storage facilities remain scarce, and the private sector does not have access to the limited facilities available in the country. Consequently, 79 percent of grain sales occur during the primary harvest season (January–March) owing to farmers' fear of storage loss and urgent need for cash. Loan repayment is the major reason farmers need to sell at low prices (Gabre-Madhin 2001; Gebreselassie 2006).

In terms of infrastructure, the country has one of the lowest road densities in the world. Road transport, which is the only means used to move grain, is dominated by the Ethiopian Freight Transport Corporation. Transaction costs are high owing to a lack of truck capacity to meet peak demand, lack of private competition, high operating costs, poor roads, and low capacity utilization. Additionally, the majority of rural people do not have access to modern transport, which is a major constraint to their ability to reach grain markets in the major production zones (Gabre-Madhin 2001).

Access to market information also remains restricted. Even in nearby markets, farmers have limited information on current prices. Likewise, grain traders with limited access depend on brokers and transporters for market information. The Ethiopian grain market chain is fairly short—that is, little value is added along the chain and handling costs are high owing to the lack of quality control measures. Other reasons for the short market chain include the lack of specialization of wholesalers and low levels of commercial processing. The market structure has improved since the market reforms, but there is still significant capacity to

[4] *Traditional* irrigation projects vary from 1 to 100 hectares. The projects are constructed through self-help programs with farmers' own initiative. *Modern small-scale* irrigation projects are constructed by the government and nongovernmental organizations. Projects make use of technologies for irrigating up to 200 hectares. *Modern private* irrigation projects re-emerged when the market-based economic policy was adopted. By 2000 private investors had developed 5,500 hectares of irrigated farms. *Public* irrigation projects consist of medium (200–3,000 ha) and large-scale (greater than 3,000 ha) irrigation projects. These projects are owned, constructed, and managed by public enterprises (FAO 2005).

increase market scale and sophistication (Gabre-Madhin 2001).

Policy, Institutional, and Organizational Failures

Modern technology use is extremely low, particularly in smallholder agriculture. Between 2000 and 2001, only 5.4 percent of total cereal farmland was grown using improved seeds. High prices and farmer preferences for local seeds saved from the previous harvest constrain demand. Organic and chemical fertilizer use is limited to about 38 percent of the total cultivated area. In 2000 around 14 percent of total cereal farmland was cultivated with the use of fertilizer. Tillage practices are also obsolete. Conventional tillage tools are inefficient and lead to prolonged periods of land preparation. Crop yields are both low and highly variable. Between 1995 and 2002, total crop yield grew by only 0.2 percent (Demeke 1999; Negatu 2005; Gebreselassie 2006).

Ethiopia's extension system—the Participatory Demonstration and Extension Training System (PADETS)—faces many problems in supplying and promoting better technologies. PADETS provides input credit packages in the form of improved seeds, fertilizers, and postharvest technologies like grain storage systems to farmers through collateral arrangements with local governments. Some studies have shown that when weather conditions are uncertain, repayment requirements involve high risks for resource-poor households in Ethiopia. Bad harvests result in loan defaults, and farmers often face harsh penalties. Given these high risks, farmers prefer to keep input costs low. Indeed, a recent evaluation of the PADETS smallholder intensification program showed that only 22 percent used the complete package and that at the end of their participation in the project, only 8 percent continued the use of improved seeds (Carlssona et al. 2005; Gebreselassie 2006).

Lack of access to finance is a key impediment to technology adoption. Short- and long-term finance remains scarce in the rural areas because the country lacks financial institutions that respond to the needs of the smallholder sector. The demand side also presents its own challenges. Small farmers lack collateral and have consumption needs that compete with resources that could be used for farm investments (Gebreselassie 2006).

Conflict has also exacerbated the effects of famine in Ethiopia, and the costs have been huge. The government's large expenditures on conflict have taken economic resources away from development efforts (von Braun et al. 1998). Debt repayments by the GOE have also put pressure on resources available for social development.

Population Pressure

Ethiopia's rapid population growth is also an important cause of famine. The current population growth rate is about 2.3 percent. Thirty-nine percent of the population lives below the national poverty line. Furthermore, 46 percent of the population is undernourished, and 47 percent of children under the age of five suffer from malnutrition. The return of Ethiopian refugees who fled to Sudan will also contribute to the population increase, especially in the rural areas (World Bank 2007; UNDP 2006; CIA 2007).

Stakeholders

It is important to recognize the role played by key stakeholders in policy design and implementation. A stakeholder analysis provides an assessment of the interests and resources of key stakeholders for policy administration. It also helps determine how these interests and resources affect program outcomes (Crosby 1991). Table 1 identifies the key stakeholders that may be involved in famine mitigation and prevention in Ethiopia.

Policy Options

Because the causes of famine are multifaceted, multiple actions are required to prevent its occurrence. On a broader level, two points must be emphasized. First, specific programs alone cannot effectively tackle famine. Micro-level interventions should be considered in tandem with macroeconomic policies. Second, market integration and price stabilization must be in place for individual projects to function effectively. Questions of policy and program choice and sequencing arise in determining the optimal program mix for mitigating and preventing famine. The solution is to combine short- and long-term interventions (aid and development) in a mutually reinforcing manner

Table 1: Stakeholder Analysis of the Key Players in the Mitigation and Prevention of Famine in Ethiopia

Stakeholder	Role/Interest	Resource Mobilization Capacity	Degree of Involvement in the Issue
Small farmers	Increased agricultural productivity and incomes	Low	Primary
Ethiopian Grain Trade Enterprise (EGTE)	Grain marketing and food policy	Moderate	Primary
Participatory Demonstration and Extension Training System (PADETS)	Smallholder intensification	Moderate	Primary
GOE (such as Ministry of Agriculture and Ministry of Economic Development and Cooperation)	Agricultural development and food security	High	Primary
Rural financial institutions	Provision of credit	High	Primary
Ethiopian Institute of Agricultural Research (EIAR)	Agricultural research for development	Moderate	Primary
Universities (such as Alemaya University)	Agricultural education and research	Moderate	Secondary
International research institutes	Food security, policy advice, plant science research, capacity strengthening	Moderate	Primary
International donors	Foreign assistance (food aid, debt relief, capacity strengthening)	High	Primary

(Webb and von Braun 1994; von Braun et al. 1998). The dimensions of time and relative impact of alternative policies and programs are shown in Figure 2.

The many causes of food vulnerability in Ethiopia that have been highlighted include rapid population growth; high rainfall variability leading to drought; land degradation and tenure constraints; inadequate access to inputs, credit, and extension; poor market structure and infrastructure; and policy-induced constraints. Strategies to improve food security and availability must address these issues. Some options to reduce food vulnerability are discussed here.

Irrigation

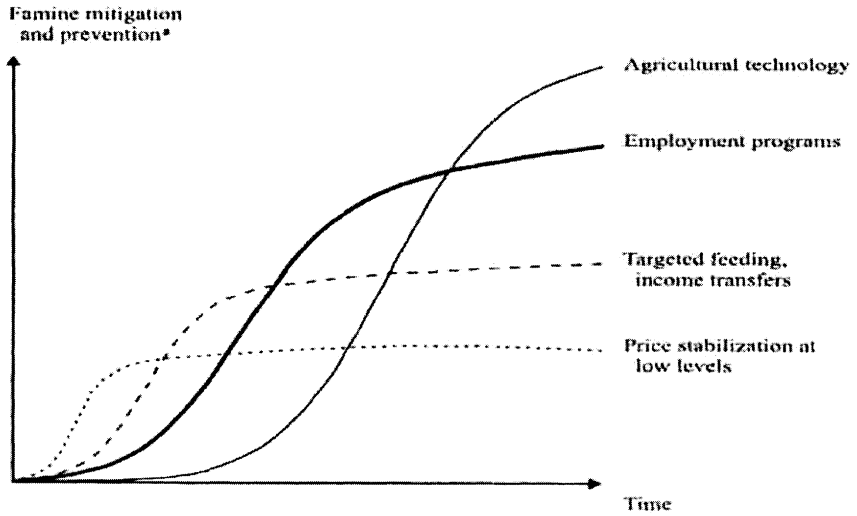
Given that Ethiopia's irrigation potential has not been fully exploited and that small farmers in rural areas lack access to modern irrigation, irrigation development is necessary. Although not a panacea, irrigation projects that are managed by farmers can contribute significantly to food security by enhancing production and farmer incomes.

Integrated solutions must tackle the full scope of the problem. Thus, a viable small-scale irrigation project should include these seven basic requirements: (1) availability of suitable land, (2) availability of water resources, (3) availability of labor, (4) availability of non-irrigation production inputs, (5) access to markets, (6) capital resources, and (7) appropriate water-lifting technology (Norman 1992; IFAD 2005).

Improved Access to Land, Technology, and Credit

Small farmers need secure property rights to make long-term investments in agriculture. Efficient allocation of land to alternative uses may be impractical if land markets are imperfect. Policy and administrative regulations that ensure the security of land tenure, as well as transparent and legal rules

Figure 2: Patterns of Time–Dependent Impacts of Alternative Policies and Programs on Famine Mitigation and Prevention



NOTE: It is assumed that there is a similar amount of resources spent on each of the alternative programs.

*Measured, for instance, in terms of number of people prevented from famine risk.

Source: von Braun et al. 1998.

that facilitate open land transactions, are needed for the use of sustainable land management technologies. Small farmers also need access to credit for farm investments in areas like irrigation, seeds, fertilizer, farm machinery, and postharvest processing technologies. The smallholder intensification programs in Ethiopia can be improved. Agricultural technologies should be properly tested for technical performance, cost-effectiveness or economic profitability, and sustainability. To ensure availability, emphasis should be given to creating incentives for adoption and making modern technologies affordable (Negatu 2005; Gebreselassie 2006). The private sector can also play a contributing role by administering outgrower schemes and participating in more market chain activities such as processing.

Market, Policy, and Institutional Reforms

The GOE needs to address the market constraints that small farmers face and invest more in road infrastructure. An improved road network can significantly reduce transaction costs. Additionally, since market risks are high, smallholders require institutionalized support for risk sharing and management (Gebreselassie 2006). Price stabilization, forward contracting, and insurance are important steps to mitigate price risk.

Although public resources for famine mitigation and prevention are limited, increased resource mobilization is necessary for short-term interventions to contribute to long-term efforts. In the short term, targeted feeding schemes and public works are helpful for income and food transfer during and after a famine. Proper management of food aid flows, particularly timely and efficient distribution of food assistance, is crucial (von Braun et al. 1998).

The role of the international donor community will remain critical to famine mitigation and prevention. International capacity must be strengthened to provide the assistance needed to those most vulnerable to famine (von Braun et al. 1998). Debt forgiveness such as the Heavily Indebted Poor Countries (HIPC) initiative will also play an

important role. Savings in debt service as a result of the assistance can free up resources for safety net programs.

Research and Extension

Research and development (R&D) efforts can help to identify appropriate water-lifting technology for irrigation. Investment in drought-resistant and high-yield crops can boost production. Proper dissemination of production and market information by extension agents is also essential. Since research and extension activities require adequate resources, collaboration with international institutes is helpful.

Assignment

Your assignment is to recommend a set of short- and long-term policies and programs to improve food security in Ethiopia that will be compatible with available government resources and reductions of Ethiopia's dependence on foreign food aid.

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Chapter Fifteen
Managing Drought Risks in the Low-Rainfall Areas of the Middle East and North Africa (7-5)

by Peter Hazell

Executive Summary

The need to improve methods for managing drought risks in the low-rainfall areas of the Middle East and North Africa (MENA) has increased in recent decades as population growth and climate change have contributed to greater demands on the resource base and accentuated both the incidence and severity of drought losses. Government interventions have typically been initiated on an ad hoc basis in response to crisis situations, and little thought is usually given to their long-term impacts on the way farmers and herders manage resources and the productivity of agropastoral systems. There is now accumulating evidence to show that once drought management interventions are institutionalized, they lead to changes in how resources are managed, including the increased cropping and privatization of rangeland resources and more settled patterns of livestock production. These changes can contribute to greater productivity and improved livelihoods. If drought management interventions are subsidized, however, they can also lead to moral hazard problems whereby herders adopt excessively risky farm management practices, with increased losses in drought years and a growing dependence on government assistance. Drought management interventions need to be designed so that they assist farmers and herders to better manage risk and to improve their productivity and incomes, but without distorting incentives in inappropriate ways. The experience with feed subsidy and credit programs in the MENA region has had mixed results, and although they have helped protect incomes and food security in drought years, they have had negative impacts on the way resources are managed. Better alternatives could be area-based rainfall insurance, particularly if offered by the private sector; the development of more accurate and accessible drought forecasting information; and a switch to safety nets that are tied to poverty criteria rather than agricultural outcomes.

Your assignment is to propose an appropriate mix of drought management policies for the MENA region, giving careful thought to the kinds of additional information needed to inform these choices.

Background

Drought has long been a significant factor in the Middle East and North Africa (MENA) region, particularly for the low-rainfall crop-livestock systems and for herders in the vast grazing areas of the steppe. Unfortunately, the level of wealth accumulated in these agropastoral societies is inadequate to provide full protection from severe droughts, and the economic and human losses in drought periods can be severe. The problem has worsened with population growth, as more and more people seek to earn a livelihood from the meager resources available in these areas. It may also have been aggravated by more frequent and prolonged droughts associated with global warming.

The high cost of droughts and the increasing vulnerability of agropastoral societies have led many governments in the region to intervene with various forms of drought assistance. Many of these interventions, however, are encouraging farming practices that could increase both the extent of future drought losses and the dependence of local people on government assistance. They are also costly to governments and use resources that could otherwise be spent for development purposes. A key question for this case study is whether drought relief programs can be designed better to achieve their immediate objectives, but without distorting economic incentives for more sustainable management of natural resources.

Farming and Resource Use in the MENA Region

About one-third of the MENA region's total population is rural and depends on agriculture for important shares of household income. Yet

agricultural land is extremely limited in the region. Arable land and permanent crops constitute only about 7 percent of the total land area; 25 percent is classed as pasture (mainly in areas with under 200 millimeters [mm] of mean annual precipitation [m.a.p.]); and 7 percent is forest and woodland (often in poor condition owing to grazing and fuel gathering). The remaining 60 percent of the area is essentially desert. The region has a Mediterranean climate with cool to cold winters and hot dry summers. Most of the rainfall is in the winter, but it is highly erratic in space and time, making agriculture a risky business.

About three-quarters of the arable area is semi-arid with only 200–400 mm of m.a.p. The scope for crop diversification on rainfed land is limited in these areas. There is a sharp decline in the share of legumes, oilseeds, and vegetables and an increasing dominance of cereals—especially barley (grown mainly for animal feed)—as one moves from higher- to lower-rainfall areas. In the driest areas, barley is increasingly grown today in what were natural grazing areas.

Despite its small area, irrigated agriculture accounts for significant shares of total agricultural production, value added, and employment. Problems of soil and water pollution from agricultural uses and urban and industrial wastes, overpumping of groundwater aquifers, accumulation of salts in the soil, and competition from other users are becoming major constraints, however, and the prospects for expanding irrigated area are very limited.

Livestock are both a principal component of agricultural incomes and the main source of family wealth in these low-rainfall and upland areas. Sheep and goats are most numerous on the low-rainfall rangelands of MENA. Cattle are more commonly maintained on farms or on grazing areas in higher-rainfall areas. Sheep numbers have increased by about 50 percent since 1961–1965, and cattle by about 5 percent.

Human population growth is high, currently around 3.3 percent a year for the MENA region as a whole, and although population is increasingly concentrated in urban areas, population density continues to increase in many low-rainfall areas. Poverty is also concentrated in these areas.

The Impact of Droughts

Although annual rainfall frequently falls below the mean, drought is associated with catastrophic rainfall shortages. Pratt et al. (1997) suggest that a drought can be said to occur in a year when rainfall falls below half the long-term average or when rainfall in two or more successive years is below 75 percent of that average. Drought of this magnitude stunts pastures, desiccates water points, greatly reduces crop yield, and kills livestock. It can lead to the liquidation of a significant part of the total flock in the absence of other sources of feed. Moreover, since the main commercial output of pastoral systems is meat, meat prices tend to be negatively correlated with drought (more animals are available for sale in drought years), and although this occurrence benefits urban consumers, it accentuates income shortfalls of producers. Producers also suffer a knock-on effect when they try to restock after drought, since prices for live animal skyrocket. As human populations grow, so do animal stocking rates—the number of animals kept on a given land area. Thus, pastures are put under increasing stress, which in turn increases their vulnerability to drought. What used to be a manageable rainfall outcome may now be considered a serious drought that leads to significant economic and social costs.

How herders traditionally manage droughts. Agropastoral societies have developed their own strategies for coping with drought. These strategies include

- mobile or transhumant grazing practices that reduce the risk of having insufficient forage in any one location;
- reciprocal grazing arrangements with more distant communities for access to their resources in drought years;
- adjustment of flock sizes and stocking rates as the rainy reason unfolds, to best match available grazing resources;
- keeping extra animals that can be easily liquidated in a drought, either for food or cash;
- investment in water availability—wells, cisterns, and water harvesting;
- diversification into crops and livestock (agropastoralism), especially in proximity to settlements, and storage of surplus grain, straw, and forage as a reserve in good rainfall years;

- diversification among animal species (sheep, goats, cattle, camels, donkeys) and different breeds within species; and
- income diversification into nonagricultural occupations, particularly seasonal migration for off-farm employment in urban areas.

These traditional risk management strategies have proved effective in managing drought and have enabled pastoral societies to survive for many centuries. The interplay between drought and traditional management systems has also helped to keep total flock sizes in equilibrium with the inherent productivity of the pastures, avoiding the long-term degradation of grazing areas. Stocking rates would trend upward between droughts as herders bred more animals and then would fall when the next drought occurred; fluctuations in herd size closely followed rainfall patterns; and peak stocking rates rarely reached unsustainable levels.

Despite their advantages, traditional drought management strategies can have associated opportunity costs. It is useful to think in terms of two types of such costs: those arising from inefficient use of resources within existing agropastoral systems, and opportunity costs arising from failure to exploit more productive agricultural development pathways.

Examples of the first type of opportunity cost are as follows: by liquidating animals during droughts, herders may end up with too few animals in the immediate post-drought period and hence miss out on important short-term production opportunities. On the other hand, given a sufficient respite between droughts, herders may build up excessive flock sizes in order to have a liquid asset as a hedge against the next drought. This practice can lead to overgrazing and the degradation of pasture, with reduced productivity. Herders also prefer to keep traditional breeds that are more drought tolerant but that might be less productive than exotics under more favorable management, and they are often reluctant to use or invest in modern inputs (such as feed and veterinary treatments) that could increase average profitability but that might lead to loss of capital investment if rainfall is unfavorable. There is a dearth of quantitative information about these costs.

The second type of opportunity cost is more speculative. If mobility and transhumant grazing practices remain the primary strategy for managing drought risk, then communities must retain large areas of land as common property and make reciprocal grazing arrangements with other communities for use in drought years. This requirement necessarily restrains the enclosure and privatization of land, which in turn can impede investment in land improvements and the development of more intensive and settled farming systems in areas where rainfall, soils, and topography make settlement a rational goal.

Without a shift to such intensification strategies, it is not clear how rural communities can continue to absorb increases in their populations. One alternative is more effective management of common property grazing areas by local communities, with collective investment in land improvements. But the absence of many successful examples in the region despite numerous donor-funded projects suggests that such local management is extremely difficult to organize, manage, and sustain, particularly in the context of rapid population growth, uncertain property rights, and the increasing commercialization of agriculture, which make cropping increasingly attractive in the less drought-prone areas.

Policy Issues

Governments throughout the region have intervened in various ways to help farmers and herders cope with drought. There are several compelling economic and humanitarian reasons why such interventions might be undertaken.

- The covariate nature of drought risk makes more efficient risk spreading difficult within agropastoral societies. All members suffer when drought occurs, and local sources of credit dry up just at a time when they are most needed. Also, livestock prices plummet during droughts when everybody is trying to sell (destock) and then rise rapidly afterward when everybody is trying to buy to rebuild their flocks (restock). Credit and insurance markets for diffusing this covariate risk are weak in the rural areas of the MENA region. These problems, as well as the poor transportation and market infrastructure for livestock products in the pastoral regions, are major obstacles to implementing more orderly destocking and restocking of rangelands as a solution to

managing drought and preventing resource degradation.

- Property rights problems over the ownership of cropland and rangeland may prevent the spread of management practices and investments that lead to more efficient drought management strategies. Without adequate property rights, population growth can lead to excessive stocking rates and to encroachment of cultivation into traditional rangeland areas. These changes in turn can induce degradation of range vegetation and soils and, by restricting the spatial mobility of flocks, increase herders' exposure to drought risk. Moreover, the inability to protect sown pastures, community-managed rangeland, private shrub plantations, and forests from wandering flocks shows that unrestricted grazing can also be damaging.
- Government has an obligation to alleviate human misery in drought years and to help protect the stock of breeding animals for the future.
- Herders and farmers may default on loans in drought years, causing difficult problems for lending institutions and reducing the average amount of credit available for agriculture.
- Overgrazing of pastures that are already drought stressed, and soil compaction in areas around water holes, may contribute to wind erosion and local climate change that have negative externality costs for a country.

Although there may be good reasons for government intervention, policies need to be carefully designed if they are to provide assistance without jeopardizing the long-term efficiency and sustainability of the farming systems. Moreover, simply being able to fix an underlying problem is not sufficient to ensure that action is economically worthwhile. It also needs to be shown that the problem can be fixed in ways that give a reasonable rate of return on public funds.

Where drought relief is required as a result of market failures (such as inappropriate property rights systems or a poorly developed financial market), it may be more cost-effective to fix the underlying problem (for example, reform property rights or strengthen rural financial markets) rather than to incur the repeated costs of drought relief. Similarly, public investment opportunities to reduce drought losses (such as by improving surface water capture and drilling more wells) may also be more cost-effective over time than drought relief. Unfortunately, these kinds of opportunities are typically quite limited in many drought-prone areas.

The cost of public drought management interventions is relatively easy to determine, but the benefits are much harder to assess. One-time interventions can provide significant humanitarian relief. But once drought management policies become institutionalized so that farmers and herders begin to take them for granted, they can lead to important changes in farming practices that affect productivity.

Any good risk management aid should enable farmers and herders to take greater risks in their quest for higher average returns. If farmers are risk averse, then they trade off some level of expected income for lower risk (through, for example, risk diversification strategies). The amount of expected income forgone to reduce risk can be viewed as a risk premium paid, or a production cost. If this cost can be reduced by the introduction of an improved risk management aid, then the farmer may be able to change strategy (specialize more in the most profitable activities, for instance) and obtain a higher average income for the same amount of risk. This change not only improves expected farm incomes, but can also lead to spillover benefits to consumers at an aggregate level through lower prices as the supply function shifts downward by the amount of the reduction in the risk premium per unit of output. This effect is similar to the effect of a new cost-reducing technology, and provided that the new risk management aid is not subsidized, then there is always a net gain to society. But if the new risk management aid is subsidized, then the effect is similar to a subsidy on any other farm input (such as fertilizer or credit). The reduction in unit cost is partly paid for by the subsidy, and the cost of the subsidy is always greater than sum of the additional producer and consumer welfare that it generates (Siamwalla and Valdes 1986).

What does this mean in practice? It means that subsidized drought management interventions can reduce risk costs to farmers to below their true social value, leading to excessive risk taking and increased exposure to future drought losses. Not only is there a built-in dependence on future

drought assistance from the government, but the net social return to the subsidy is negative. The bottom line is that wherever possible, public interventions should be limited to drought management interventions that farmers pay for themselves, although it might be necessary for governments to devise arrangements that allow deferred payment in installments. Subsidies, when used, should be targeted specifically to the poor who cannot otherwise afford the drought protection they need and who control few resources so that any undesired distortions in resource allocation can be ignored.

Another potential problem with poorly designed drought management policies is that they can lead to moral hazard, a well-known problem in the insurance literature. Moral hazard refers to the incentive problems that arise when an insurer underwrites risks whose outcomes can be influenced by the insured's behavior. For example, if an insurance company contracts to compensate a farmer for yield losses against pest and disease damage, then the farmer will have reduced incentive to be diligent in protecting or treating her crop once she realizes that the insurance will compensate for losses anyway. In the case of livestock insurance, problems can arise because supposedly dead animals may "walk" elsewhere or their bodies may be sold for meat. Moral hazard leads to greater losses than necessary, increases the risk exposure of the insurer, and makes actuarial calculations of those risks almost impossible. Similar problems can arise if a government indiscriminately compensates for drought losses that could have been reduced or avoided by herders. Unless appropriately targeted, feed subsidy programs could, for example, lead to reduced incentive to exploit remaining grazing opportunities, particularly in more remote areas that require greater time and expense to reach. Debt forgiveness in drought years can also generate moral hazard problems. Once farmers know that their debt will be forgiven, they have increased incentive to borrow more than is prudent and reduced incentive to minimize their costs during droughts. Such behavior leads to greater losses than necessary and makes feed subsidies and credit programs more expensive than they need to be.

Governments throughout the MENA region have intervened to help manage drought losses, but usually on the basis of crisis relief once the drought has set in (interventions have included distribution of subsidized feeds for livestock, well drilling, and debt forgiveness). Since the primary motive is typically humanitarian assistance, not much thought has been given to the longer-term impacts of drought interventions on farming practices and productivity.

The result is often an inappropriate set of economic signals to farmers and herders, leading to unsustainable farming practices in drought-prone areas that increase both future drought losses and farmers' dependence on government assistance, as well as to moral hazard problems that further add to the government's cost of providing drought compensation. A good analogy is the experience with hurricane disaster assistance in the United States. By routinely stepping in to compensate homeowners for their losses after a hurricane, the government encourages home construction in vulnerable coastal areas where prudent investors would not otherwise build and encourages fraudulent practices within the home repair and construction industry. These problems add enormously to the cost of government assistance over time.

Stakeholders

The main stakeholders are the farmers and herders whose welfare is most at stake in drought years. But because drought interventions have longer-term impacts on the way resources are managed, they also generate environmental outcomes that are of concern to the populace in general and they affect meat and cereal prices, which are of concern to consumers. The interests of these different stakeholders are not always complementary, and trade-offs can arise. For example, consumers may prefer more abundant supplies of meat and cereals, but this desire may not be consistent with sustainable land and pasture management in the low-rainfall areas. On the other hand, farmers and herders will favor generous compensation in drought years, even though this approach may lead to excessive stocking rates and the further encroachment of barley planting into traditional grazing areas, neither of which is environmentally sustainable.

Policy Options

There are three possible sets of policy options for the future. The first is to continue with the present types of drought relief interventions but to find ways of making them less distorting. The second is to introduce some new policy instruments that are less costly and that do not distort incentives. The third option is to withdraw all drought

management interventions, allow agricultural markets to work in an unfettered way, and put in place general safety net programs for the poor that are not tied to farming practices or outcomes. These policy options are outlined here.

Current Policy Instruments

Investments and policies to reduce drought losses. There are a number of investments that can reduce farmers' exposure to drought losses. These options include investing in physical structures and wells to increase irrigation and water supplies, contouring land or planting vegetative bunds to improve water capture in soils, and planting drought-resistant shrubs in grazing areas. These actions need not all be financed by government. In some cases, simply strengthening property rights over cropland or providing long-term credit may provide sufficient incentive for farmers to make their own private or group investments. Public investments in agricultural research can also be targeted toward developing more drought-tolerant crop varieties and livestock breeds, thereby reducing yield losses in drought years. Improvements to rural roads can broaden the reach of local markets, helping to move livestock and feed over wider areas in the event of drought and buffering potential price fluctuations. Most of these investments are win-win strategies that improve average farm productivity while also reducing exposure to drought losses.

Feed subsidies. Feed subsidy programs provide supplementary feeds to safeguard livestock, with the predominant expenditure going for subsidies toward the costs and distribution of concentrates and other feeds, especially barley. These programs have been quite successful in protecting livestock numbers and production during droughts. They have also had negative impacts, including the following:

- They have probably accelerated rangeland degradation in the long term by undermining the traditional process of adjusting flock size to interannual climatic variations. Herd sizes have increased sharply in recent years, and grazing practices have changed so that many of the animals no longer leave the rangeland areas during the dry season but have their feed and water trucked in. This practice leads to overgrazing during the dry season, reduces the natural seeding of annual pasture species, disturbs the soil, and contributes to wind erosion, particularly in areas near water and feed supply points. User fees have been suggested as an economic signal of the scarcity and value of the rangelands, but whether this approach would be a viable option in these large and often remote areas remains to be tested.
- Government procurement prices for barley have encouraged the mechanized encroachment of barley cultivation onto rangeland areas where it cannot be sustained. An additional motive in some countries is that cultivation allows its perpetrators to claim user rights to the land.
- Feed subsidies have added to the fiscal burden on governments.
- Subsidies tend to become permanent, and they have proved difficult to target, with the lion's share of the subsidized concentrates going to large herders and to commercial farms.

Credit support. Systematic rescheduling of credit for farmers during drought years has also been an important policy approach to drought management in the MENA region. Although this approach provides some short-term relief to herders and small farmers, it has proved of greatest benefit to larger farms and contributed to the chronically poor debt collection performance of the region's agricultural development banks. Perhaps a better approach would be to provide consumption credit, not tied to agricultural loans, to smooth consumption across years.

New Possibilities for Improved Drought Management

Rainfall insurance. Agricultural insurance has often appealed to policy makers as an instrument of choice for helping farmers and agricultural banks manage climate risks like drought, and indeed many billions of dollars of public money are spent each year on agricultural insurance around the world. But the experience has generally not been favorable (Hazell et al. 1986). Publicly provided crop insurance has without exception depended on massive subsidies from government, and even then its performance has been plagued by the moral hazard problems associated with many sources of yield loss, by high administration costs, by political interference (especially compensation payments in election years!), and by the difficulties of maintaining the managerial and financial integrity of the insurer when government underwrites all losses (Hazell

1992). Livestock insurance that compensates for loss of animals or reduced productivity because of drought has rarely been offered, and seemingly not at all for herders in traditional pastoral systems. There are good reasons for this: the incidence of drought losses is usually too high to make the insurance affordable, opportunities for fraud and moral hazard are too great, and there is little opportunity for on-farm inspection of management practices or loss assessments, particularly when the animals are on the move.

But given the frequent occurrence of drought and the widespread damage it causes, there clearly is a need for some form of insurance against drought losses. Indeed, if such insurance could be successfully designed, it might well displace the need for many existing drought management policies.

What is needed is a form of insurance that is affordable, accessible to all kinds of people, compensates for total income losses, is practical to implement given the limited kinds of data available, and can be provided by the private sector without the need for government subsidies.

Area-based rainfall insurance offers a promising new alternative that in principle can meet all these requirements listed above (Skees et al. 2000). In this approach, rainfall insurance contracts are written against specific rainfall outcomes, like drought at a local weather station. The rainfall events should be defined at catastrophic levels, and they should be highly correlated with the value of regional agricultural production or income. For example, an insured event might be that rainfall during the most critical month of the growing season falls 70 percent below normal. In years when the insured event occurs, all the people who purchased the insurance would receive the same payment per unit of insurance. In all other years, no payments would be made.

Insurance would be sold in standard units (for example, $10 or $100), with a standard contract for each unit purchased called a standard unit contract (SUC). Purchasers would decide how many SUCs to buy. The insurance would be sold on a full-cost basis, and the price of the SUC would be the premium. The insurance would need to be sold before season-specific information about the insured risk becomes available. Consequently a purchasing deadline would be established (such as a month before the normal arrival of the rainy season), after which new SUCs would not be sold.

Area-based rainfall insurance has a number of attractive features:

- It avoids the moral hazard and adverse selection problems that plague crop insurance programs.
- It could be very inexpensive to administer.
- It uses only rainfall data, which are available in most MENA countries for long periods of time.
- The insurance can be sold to anyone at risk when there is a drought, including agricultural traders and processors, farm input suppliers, banks, shopkeepers, and agricultural workers. There is no need to be a farmer or to keep livestock.
- It would be easy for the private sector to run.
- As long as the insurance is voluntary and unsubsidized, it will be purchased only when it is a less expensive or more effective alternative to existing risk management strategies.
- A secondary market for insurance certificates could emerge that would enable people to cash in the tradable value of a SUC at any time.
- By providing a way of insuring borrowing groups against covariate risks, it could help broaden the reach of microfinance programs to include more agricultural lending.

Any scheme for area-based rainfall insurance must overcome a number of difficulties:

- The insurer faces high risk because of the covariate nature of the insured risk. When a payment is due, then all those who have purchased insurance against the same weather station must be paid at the same time. Moreover, if the insured risks at different rainfall stations are highly correlated, then the insurer faces the possibility of having to make huge payments in the same year. To hedge against this risk, the insurer can either diversify regionally by selecting weather stations and risks that are not highly positively correlated or seek reinsurance in international financial markets.

- Rainfall stations must be protected to prevent possible tampering of rainfall measurements. Possible approaches include (1) more secure, tamper-proof stations and instruments, (2) triangulation of readings from neighboring weather stations, and (3) verification of low soil moisture by remote satellite sensing.
- The volume of insurance sold could be too small to be profitable. The insurance will only appeal to people whose economic losses are highly correlated with the insured rainfall event. If the basis risk (the uninsured part of a person's risk) is high, then the insurance will not sell. Also, if the probability of the insured risk is high, then the cost of the insurance could be prohibitive. To overcome these problems, the insurance should be limited to truly catastrophic droughts that significantly affect agricultural production in a region.
- Global climate change and weather cycles (such as the Pacific El Niño Southern Oscillation [ENSO] weather patterns) can change the probability of the insured events, and insurers will be challenged to find cost-effective ways of adjusting the premium rates they charge to reflect changes in the underlying risk of loss.

The private sector has been slow to take the initiative in developing rainfall insurance in developing countries, and several setup problems might require government intervention to jump-start activity. These interventions could include paying the research costs of identifying key catastrophic rainfall events that correlate strongly with agricultural production and income; educating rural people about the value of rainfall insurance; ensuring secure rainfall stations; establishing an appropriate legal and regulatory framework for rainfall insurance; and underwriting the insurance in some way (perhaps through contingent loans) until a sufficient volume of business has been established so that international reinsurers or banks are willing to come in and assume the underwriting role. These interventions need not be costly and could prove crucial in launching rainfall insurance. But it is also important not to launch the insurance on a subsidized basis so as not to distort incentives for private insurers or farmers and herders. Drought insurance of the kind proposed here is being piloted in a number of developing countries with the active interest of international insurers (World Bank 2005).

Early warning drought forecasts. In principle, the ability to provide early warning drought forecasts could be a powerful tool for avoiding many of the economic costs associated with the misallocation of resources that arise because farmers, herders, and other decision makers must commit resources each year before key rainfall outcomes are known. For example, decisions about planting crops (such as date of planting, seeding rate, and initial fertilizer treatment) often have to be made at the beginning of the rainy season before knowledge about rainfall outcomes is available. The economic value of season-specific forecasts depends on the degree to which farmers can adjust their plans as the season's rainfall unfolds. Of course, the reliability of the forecasts and the ability of the farmers to adjust their initial decisions in response to this information are also critical. If decisions about planting and cultivation practices and the feeding, culling, and seasonal movement of livestock can be sequenced, with key decisions being postponed until essential rainfall data are available, then forecast information will be less valuable. But if most decisions must be made up front each season, then the scope for mistakes will be much larger and the potential economic gains from reliable forecast information will be greater. Stewart (1991) examines how the date of onset of the rainy season can provide a fairly reliable forecast of the ensuing seasonal rainfall pattern for Niamey, Niger, and shows how this information could be used to more optimally adjust planting and input decisions for the season (this is his "response" farming approach). Barbier and Hazell (2000) use a stochastic programming model to show how many of the decisions in a typical agropastoral community in Niger can be optimally adjusted to rainfall outcomes.

Reliable drought forecasts could also enable governments and relief agencies to position themselves each year for more efficient and cost-effective drought interventions. This possibility has already been realized, and several early warning drought systems now in place in Africa have proved successful in giving advance notice of emerging drought situations. But these programs are really monitoring systems that track emerging rainfall patterns within a season rather than true weather forecasting systems that predict rainfall outcomes before they even begin.

Reliable multiyear rainfall forecasts are not yet possible, but seasonal forecasts (from three to six months out) have become more reliable, particularly where an important part of the year-to-year variation in seasonal rainfall can be attributed to the Pacific ENSO weather patterns. As the ability to model these phenomena at the global and regional level improves, it seems plausible to expect that more reliable seasonal forecasts will be available at local levels. Private weather forecasting services may expand and become more available to developing countries. But this is also an area where government could play a catalytic role, and even subsidize many of the development costs, without having to worry that this involvement would distort resource management incentives at the farm level.

Nonagricultural Safety Nets

A very different policy approach is for governments to withdraw from providing any direct support to agriculture in drought years and to focus instead on providing efficient and well-targeted safety net programs that ensure that all needy people have adequate access to food and other essentials, including in drought years. This approach would be consistent with recent market liberalization programs in some MENA countries and their greater openness to food imports from abroad. It would, however, probably lead to a shift toward more extensive farming systems in the low-rainfall areas, with a reduced capacity to support the existing rural population in agriculture.

Assignment

Your assignment is to propose an appropriate mix of drought management policies for the MENA region, giving careful thought to the kinds of additional information needed to inform these choices.

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Chapter Sixteen
Policy Measures for Pastoralists in Niger (7-6)
by Erica Phillips

Executive Summary

Pastoralism is often misunderstood, labeled "backward" and "irrational," and considered environmentally destructive by many policy makers. Bias toward settled farmers has historically dominated research institutions, governments, and development nongovernmental organizations (NGOs), and some countries have attempted to forcibly settle their pastoralist populations. In many arid and semi-arid regions, however, pastoralism is the best or only way humans can make productive use of natural resources. Pastoralists have adjusted to some of the harshest conditions in the world and have well-designed, adaptive livelihood strategies. In addition, pastoralists contribute to one of the strongest export sectors in certain countries—the meat market.

Over the past few decades, multiple factors have threatened the livelihoods of Niger's pastoralists, causing pastoralists and agropastoralists to be some of the most food-insecure populations in the country. These factors include severe droughts, a decrease in accessible grazing land due to increased land pressure from growing farming populations, conflict over land, environmental degradation, and changing land tenure laws, which often bring ambiguity and a bias toward settled farmers. Mobility and access to grazing lands and water are essential to pastoralists' livelihoods and are their most important risk management strategies. Even with well-designed livelihood strategies, if pastoralists lack access to secure grazing areas and water points, their livelihoods are in jeopardy.

In an effort to better manage natural resources and protect its public goods, Niger's government has created a law that redefines who can claim land, who can use land, and who mediates conflicts over land. This law follows a trend among countries in the region, which have created laws devolving natural resource management to local communities, placing more control in the hands of community members themselves. Often, however, such laws have led pastoralists living in agropastoral zones to lose access to grazing land.

Today, some policy makers ask if pastoralism can evolve, possibly by being integrated with farming, or if it is bound to fade away, consumed by modern society. Vital policies for sustaining and improving pastoralists' livelihoods include drafting realistic laws or mechanisms to facilitate ease of mobility and access to land. Other policy options include designing strategies to help pastoralists out of emergency situations caused by drought, improving market possibilities for livestock, promoting cooperation between settled and nonsettled groups, and conducting research into livestock management and mixed farming systems improvement.

Your assignment is to create a policy package that would preserve the livelihoods of Niger's pastoralists. You must take into account the multiple interactions, needs, and priorities of all stakeholders and design policies that can support the livelihoods of all of these groups. You must also consider who has the capacity and which party or parties are best suited to enact these policy options.

Background

Arid or semi-arid lands cover 43 percent of Sub-Saharan Africa (SSA), with 50 million pastoralists living in these regions (Dixon et al. 2001). Pastoralists' main source of livelihood is the raising and sale of livestock. They often move seasonally with their herds in search of fresh pasture and water, but there are many types of pastoral systems, ranging from completely mobile to completely sedentary systems, including nomadic or transhumant[1] and agropastoral transhumant systems. The United Nations Development Programme (UNDP) considers a household "pastoralist" if more than 50 percent of its gross household income comes from livestock goods (milk or meat) produced and consumed using unimproved pastures (UNDP

[1]Transhumance is the seasonal migration of livestock owners and their animals in search of grazing land.

2003). "Agropastoral" households earn more than 50 percent of their income from the cultivation of crops and 25 percent from livestock (UNDP 2003). Pastoral and agropastoral systems produce about 70 percent of the milk and meat in Sub-Saharan Africa (Ibrahim and Olaloku 2000).

Niger's Pastoralists

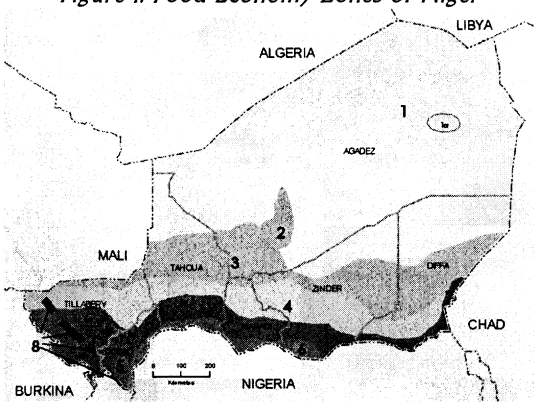
The northern four-fifths of Niger is semi-arid or arid and is not habitable by agriculturalists because it does not receive enough rainfall to support rainfed farming.[2] The best-adapted livelihoods in these dry areas are pastoralism and agropastoralism. The pastoral zone borders the desert—its northern limit is the Sahara Desert—and its southern limit is the northern edge of the agropastoral zone. The agropastoral zone is climatically unpredictable, receiving between 200 and 400 millimeters (mm) of rain annually, bordered by the pastoral zone to the north and the settled, rainfed agriculture zone to the south. The majority of the population of Niger consists of sedentary Hausa or Djerma farmers, who live in the rainfed agriculture zone or the semi-arid southern Sahel zone, which receives between 400 and 600 mm of rain a year. Figure 1 shows the food economy zones of Niger.

One group of pastoralists in Niger is the Fulani people,[3] who have occupied the Sahel region of Africa (located just below the Sahara Desert and stretching across Africa from the Atlantic Ocean to the Red Sea) for thousands of years. They comprise about 9 percent of the population of Niger. Originally thought to be from the upper Nile region dating back to around 2000 BCE, the Fulani people migrated across the Sahara Desert as the desert climate became less hospitable. A large share of Fulanis across the Sahel have either adopted an agropastoral livelihood or settled permanently in villages. Most Fulanis living in the agropastoral zone practice an agropastoral transhumant lifestyle, sending certain members of a family to accompany the family's herds, often for months at a time.

Niger's other large pastoralist group is the Tuareg people, who make up about 8 percent of the population. Most Tuaregs raise camels, sheep, and goats in the pastoral zone, whereas Fulanis raise cattle, sheep, and goats in the agropastoral zone.

Some argue that pastoralist livelihoods are threatened, as diminishing grazing lands, encroaching farmland, drought, environmental degradation, and poor policy threaten their traditional way of life. The encroachment of farmland is particularly worrisome for agropastoral Fulanis who live close to settled farmers and are therefore more likely to interact and possibly clash with farmers over land. Although many analysts are quick to identify poor natural resource management, climate variability, and drought as factors that threaten pastoralists, others argue that economic, social, and institutional factors are equally to blame for destabilizing pastoralist communities (Batterbury and Forsyth 1999).

Figure 1: Food Economy Zones of Niger



Zone 1 – Sahara Desert
Zone 2 – Air mountain cultivation zone
Zone 3 – Pastoral zone
Zone 4 – Agropastoral zone
Zone 5 – Rainfed agriculture zone
Zone 5a – Subzones at high out-migration for work
Zone 6 – Southern irrigated cash crop zone
Zone 7 – Komadougou River and Lake Chad cash crop zone
Zone 8 – Niger River irrigated rice zone

Source: FEWS NET 2005.

Pastoralists have adapted to arid and semi-arid environments by employing a complex system of livelihood strategies developed over thousands of years in response to climatic variation, seasonal changes, and drought. The most important of these livelihood strategies are mobility and access to

[2]Pearl millet, the most widely grown crop in Niger requires between 250 and 700 mm of rainfall.

[3]There are different names for Fulanis, depending on the country, but they refer to themselves as Fulbe. Fulani is the Hausa designation, while Fula is the Mandinka term, and Peul is Wolof (see http://www.isp.msu.edu/afrlang/Fula_root.htm).

grazing land. Moving livestock to different pastures is essential for minimizing exposure to erratic rainfall and "reliable access to a wide range of pasture resources has long been essential to the viability and sustainability" of pastoral systems (McCarthy et al. 2004, vii). Other commonly used livelihood strategies include settling for a rainy season to grow cereals, migrating to cities or coastal countries to earn income during the dry season or after a drought year, and attempting to save productive animals in a crisis and selling nonproductive animals. Because female livestock are needed to restock a herd, pastoralists will save female animals and sell males.

Niger's climate is harsh and unpredictable. Typically, there are three seasons a year—the rainy season, the cold season when the southwest Harmattan winds blow, and the hot season. The rainy season, which most of the country depends on for cereal and forage production, runs from June to September. In semi-arid and arid areas, rainfall is highly variable, and rainfall levels fall sharply as one moves northward. During the rainy season, there is abundant grass with good nutrition available for herds. Herders and their animals can roam in the rangelands, and there is access to water, as seasonal ponds and rivers are filled. In the dry season, however, pastures do not offer nutritious grasses and shrubs, so herders are strategic about their movements. If there is not enough forage in one area, herders move with their animals to locations where there is sufficient feed. During the dry season, herders must stay within 15–25 kilometers (about 9–15 miles) of wells to assure that their herd is watered (Thébaud and Batterbury 2001).

As described, access to grazing areas is critical for pastoralists as a safeguard against multiple types of risk. Even though pastoralists can travel thousands of miles in a year with their herds, they often "favor a particular home territory based on pasture conditions, water courses and dry season wells" (Thébaud and Batterbury 2001, 73). These are lands that are not owned as private property, but instead governed as common pool (or property) resources (CPR).[4] The grazing rights to these areas have been negotiated by families and pastoralist groups for hundreds of years.

Niger's government holds a unique blend of political, administrative, and traditional authority, and in many rural areas, a mix of traditional and "modern" authority prevails. Nomadic groups are traditionally governed by *chefs de groupements* (chiefs of pastoral groups), who govern only pastoral groups. They have no formal rights over land use. Sedentary groups in Niger are traditionally governed by *chefs de cantons* (canton chiefs), who are responsible for "the management of defined territories, control tenure rights, and may also allocate cultivatable land" (Hammel 2001, 2). The *chef de canton* reports to an appointed government administrator, who is responsible for management at the local government level.

Relations of Fulanis with Farmers

Interactions between the agropastoral Fulanis and the Hausa and Djerma farmers reflect the evolution in farming systems. In the past, the two groups had a symbiotic relationship, in which herders cared for farmers' animals during the rainy season, taking them to open grazing lands north of the agricultural zone. Then the animals would not destroy crops growing in fields and would have access to more forage. Herders were traditionally compensated by farmers in grain at the end of the rainy season. In another form of cooperation, herders' animals were corralled onto a field during the dry season to allow the animals to contribute to soil fertility with their manure.

In recent years, the relationship between herders and farmers has shifted from being mostly complementary and cooperative to being more defined by conflict over natural resources. This change can be blamed partially on agricultural constraints in Niger, including a growing population, high demand for agricultural products in urban areas, increased land pressure and decreased farmland per capita, diminished resources, and changing farming systems. Today both groups are attempting to reduce their risk by diversifying their livelihood activities. Most settled farmers now include livestock production in their cropping systems, and some pastoralists are settling permanently or seasonally to farm. In settled rural and urban populations, women now raise cattle, sheep, and goats part time for consumption and as a form of income and savings (Tiffen 2004). In rural areas, farmers carry manure from these animals to fields to increase soil fertility, and the cattle are used for

[4]A common-pool resource (CPR) is a particular type of good consisting of a natural or human-made resource system, such as grazing lands or irrigation areas. CPRs are distinguished from public goods due to the difficulty in (1) excluding parties from utilizing CPRs and (2) preventing overuse or abuse by one party that would potentially make that resource less available to others.

transport. Sedentary farmers are increasingly using crop residues to feed their own livestock during the dry season and using manure from their own livestock on their farms, thus depriving pastoralists of opportunities for income and of grazing lands (Tiffen 2004).

Some analysts doubt the direct link between scarce resources and conflict between stakeholders. They point out that social, political, and economic disputes are just as prevalent and instrumental in causing conflict (Moritz 2006). These sources of conflict include changes in land tenure laws, in natural resource management, and in market structures. They also argue that well-intended government and NGO projects have altered traditional interactions. For instance, Fulanis traditionally have a complex system of common property regimes through which access to water and pasture lands is negotiated between users. Individual ownership is rare, since groups depend on reciprocal arrangements to ensure mobility. In the 1980s, however, the government built watering points—cement-lined wells and boreholes—in eastern Niger. Conflict resulted as different pastoralist groups, including Tubu, Arabs, and Fulani, competed for water and land around the watering points (Thébaud and Batterbury 2001).

The Economy of Pastoralism

Fulani households raise cattle, ownership of which confers prestige, and smaller ruminants such as sheep and goats. Smaller ruminants have less-demanding fodder requirements, so they are less risky to raise. Given Niger's unimodal rainy season, pastoralists attempt to have the animals gain as much weight as they can during the rains, when grasses and residues are lush, and lose as little weight as possible in the dry season. Livestock numbers move in cycles; herds are larger in years or cycles of good rain and smaller in drought years. Animals are sold only when there is a need for cash or grain, because selling animals is the most economic (in financial and caloric terms) way for pastoralists to survive (FEWS NET 2005). In other words, pastoralists rely on animals more for income and savings than for direct consumption. A household can survive by selling 20 goats or sheep per year for a household of 8–10 people (FEWS NET 2005). Fulani women contribute to household income by selling milk or butter in villages during the rainy season, when milk production is highest.

Livestock is Niger's second overall export commodity after uranium. In 1997 livestock contributed 20 percent of Niger's export earnings. A 1993 livestock census estimated that Niger had approximately 2,991,000 tropical livestock units (TLU),[5] estimated to be valued at more than US$300 million (Hulsebusch and Schlecht 2001). Most livestock are sold either in Niger or to Nigeria, where 90 percent of hides, skins, and cattle are exported. This trade pattern is typical in West Africa, where protein (meat, peanuts, and cowpeas) travels south from the Sahel to coastal countries and carbohydrates (rice and maize) travel north. Niger and Nigeria share a large border, and most livestock cross the border unofficially and thereby avoid taxes or regulation. Although not all of these exported cattle are raised by pastoralists, they contribute to a large portion of the market.

Stakeholders

The main stakeholders in this case include the different groups and different types of Nigerien pastoralists, settled farmers who interact with pastoralists, the Nigerien government, and international NGOs. Although it is the farmers and pastoralists who interact on a daily or seasonal basis, the government of Niger has the power to influence these interactions by establishing a framework for natural resource management, reforming land tenure, and setting economic development priorities. Because farmers and pastoralists may be focused on their immediate needs for survival, the government has the power to frame these issues over the long term and guide populations toward successful livelihoods through policy decisions. The government can do this, however, only if it has the foresight to create long-term policy and if it finds effective ways to enforce these policies with its limited financial resources. International NGOs are also a stakeholder, because some are returning to work in pastoralist and agropastoralist zones, particularly since the 2005 famine. Projects that have been directed at pastoralists include health care for humans and animals, education, borehole and well building, promotion of seed banks, food-for-work programs, and livestock-buying schemes.

[5]A TLU is a common unit to describe livestock numbers of various species as a single figure that expresses the total amount of livestock present, accounting for different livestock varieties that may differ significantly in size. A typical TLU is one cattle with a body weight of 250 kilograms (LEAD 2006).

Policy Issues

Pastoralist groups have long been ignored or underserved by their governments (Warren 1995, as cited in Thébaud and Batterbury 2001). Research institutions, NGOs, and governments alike have pursued policies and programs (intentionally or unintentionally) that are biased toward settled farmers with cropping systems. One reason for this bias is that settled farmers are closer to urban areas and have better access to decision makers. Pastoralists inhabit remote areas, are more dispersed, and are not well organized, making participation in decisions or contact with decision makers difficult. In addition, fewer decision makers are pastoralists by ancestry, and decisions are made under the assumption that pastoralists lead a backward lifestyle. Although the effects of the Green Revolution were scarcely felt in Niger, one critique of the Green Revolution is that it favored sedentary farmers by focusing on plant systems and crop breeding while neglecting livestock systems (McCarthy et al. 2004). This legacy of bias in research into cropping systems continues in Niger, with only 15 percent of projects at Niger's National Agricultural Institution focused on livestock in 2004 (Stads et al. 2004). The 2000 Nigerien census neglected to include cattle or pastoral production, focusing strictly on cereal and horticultural crops (Stone Environmental 2001). Since the 1980s, many pastoral development projects have been terminated because funders have been perplexed by pastoralists and unsure of how to improve their livelihoods (Thébaud and Batterbury 2001).

Some predict that pastoralism will gradually disappear and that pastoralists will eventually settle into permanent communities. Others argue that farmers' and pastoralists' systems will merge and that mixed crop-livestock systems will become the dominant farming system in the region. One experienced geologist in northern Nigeria predicts that integration of pastoralism and farming systems is the wave of the future and is a more realistic option than trying to eliminate pastoralism altogether (Mortimore 2000).

Food Insecurity

Pastoralist populations are some of the poorest and most food insecure in Niger. Following the droughts of 1973 and 1984, Nigerien pastoralists lost most of their cattle through death or sales. In 2000 there were fewer livestock in Niger than before the 1973 and 1984 droughts, even though the agropastoralist population almost doubled between the early 1970s and 2000 (Barbier and Hazell 2000). In periods of drought, not only are animals weakened, but stress or distress sales drive pastoralists to bring their animals to market all at the same time, forcing livestock prices down. These sales usually coincide with an inflation of cereal prices, lowering the livestock-grain terms of trade and all but eliminating pastoralists' access to food. Livestock prices during the 2005 Niger famine fell from US$120 a cow to as little as US$10 (Quist-Arcton 2005). In April 2005 it was estimated that 2.4 million of the 3.6 million people living in the agropastoral areas were highly vulnerable to food insecurity (FEWS NET 2005). After a drought, it takes years for herds to recover and become productive again because livestock are pastoralists' form of savings. When livestock are sold, "savings accounts" are depleted, so it is difficult to generate enough capital to restock herds.

More than 50 percent of the people who live in the agropastoral and pastoral zones are considered poor. In the agropastoral zone, rainfall is sufficient one in every four or five years to produce enough cereal to last almost the entire year (FEWS NET 2005). A report by the Food and Agriculture Organization of the United Nations (FAO) described pastoral systems as having a severe incidence of poverty, low potential for poverty reduction, and low potential for agricultural growth. Agropastoral systems, on the other hand, are considered to have potential for poverty reduction and low to moderate potential for agricultural growth (Dixon et al. 2001). This report sites better land husbandry, water harvesting plus multiplication of drought-resistant, early-maturing millet and sorghum varieties as areas of potential intervention to increase agricultural production. Seasonal migration to coastal countries is often used as a strategy to increase household income, but this step is more often taken by middle-income families, as traveling can be expensive and reduces available labor in the household.

Mobility and Access to Land

It has been asserted that pastoralists only have rights to land if they also cultivate that land (Mortimore 2000). Since 1970 the land area used for agricultural purposes has risen sevenfold, half of the forests have disappeared, and erosion has increased. Population growth in Niger is estimated at 3.3 percent per year. This high growth rate leads to increased land pressure, in which communities expand land under cultivation and thereby

encroach on traditional grazing lands. Since the 1970s agricultural expansion has pushed pastoralists 50 kilometers northward (Hammel 2001). Even with increased land use, however, farmers' crop yields have stagnated for the past 10 years, showing that lands cleared for use have been marginal and that few technological advances have been made accessible to farmers to increase crop yields. With populations rising and yields stable, farmers may continue to convert more land to farm use and reduce fallow periods on their fields (Greaf and Stahr 2000). For pastoralists, this increased land pressure limits their animals' access to grazing lands. Because mobility is a means of reducing pastoralists' risk to climatic variability, any restriction on this livelihood strategy can be detrimental to pastoralists. A modern Fulani proverb shows how Fulanis are being displaced by agriculturalists: "Every area cleared of lions by pastoralists is then cleared of pastoralists by farmers" (Hammel 2001, 3).

Much of the conversion to farmland has taken place on common property (or pool) resources, squeezing herders off of the land or making certain areas inaccessible owing to the fragmented landscape. According to Williams (1998, 2), "CPRs provide food, fuel, fodder, herbs, construction materials and income to rural and urban dwellers across the Sahel." They are also the main source of fodder and water for livestock in the region and are therefore essential to herders.

Devolution of Natural Resource Management

Land tenure systems are the way in which humans regulate their interactions with natural resources. Governments in West Africa have tried to clarify land tenure issues and reinforce the rights of local communities to manage their resources by granting legal recognition to traditional tenure arrangements and turning decision-making authority over to local communities. The philosophy of land tenure reforms is that increasing tenure security precipitates increased agricultural investment and intensification and conservation of land. Bloch and Foltz (1999, 1) caution that "tenure reforms, in theory can provide many of the necessary incentives for sustainable economic development, but, it is also necessary to take a broad vision of land reform and consider them in the context of an overall governmental program."

A large shift in mentality is taking place from top-down, centralized natural resource management toward a more participatory, community-centered approach. Centralized governments have been criticized for their inability to effectively or equitably manage natural resources, and many countries have shifted toward a mix of management by local and state institutions and organizations. Experience has shown, however, that simply decreeing local communities responsible for their natural resources is not practical. Communities are heterogeneous and have a diversity of interests, objectives, and production strategies, and they contain diverse uses of natural resources. Local institutions and power structures might not have the capacity to manage local resources. Without consultation with or education of stakeholders, land tenure changes can be more confusing to communities, instead of resulting in clarity of land use. Failure to recognize the rights of all user groups (including pastoral groups) can lead to appropriation of resources by wealthier or more powerful groups.

An approach called *gestion de terroir villageois* (management of village territories) has been used in neighboring Burkina Faso and Mali. This approach involves local communities in designing a management plan for the village and its surroundings in cooperation with ministerial services. The approach assumes rural power structures created by the government will serve the needs of *all* of the citizens in the community, but some groups are still left out (Williams 1998). Since herders are often transhumant, they are not included in designing or implementing the natural resource management plan, and it has been found that pastoralists have lost access to grazing lands where this approach has been adopted.

Niger's Rural Code

Most land tenure reforms in the Sahel have restricted pastoralists' rights as reforms have aimed to privatize property (Bloch and Foltz 1999). Niger's Rural Code is an exception to this trend. The Rural Code, drafted in the 1980s and 1990s, dictates the land tenure system and defines the use of, division of, and rights to all natural resources in Niger. The Rural Code systematizes many of the customary land tenure systems used for hundreds of years by different ethnic groups in Niger. Village and canton chiefs, who govern only settled groups, however, remain the principal authorities responsible for land distribution. Although it has not been fully implemented owing to the changes in the government and weak enforcement capacity, it is one of the most progressive land reforms in the

Sahel and contains the principle of "priority rights" to guarantee herders the right to control land traditionally used by them. The goal of the Rural Code is to clarify land tenure rules and to reinforce the legal institutions charged with regulating land tenure. It is thought that this law will lead to an increase in productivity and investment and foster more sustainable agricultural production strategies. It is also believed that clearer land tenure laws will prevent overexploitation of communal lands and thus prevent the "tragedy of the commons"[6] phenomenon from occurring.

The Rural Code is based on three principles:

1. Natural resources in Niger are a common heritage of the whole population. All inhabitants have access to these resources without discrimination with regard to gender or social background.
2. The "imaginary" division of the territory into arable land and grazing zones is abolished. Farmers and pastoralists are requested to mutually respect their land use rights.
3. Private property rights of groups or individuals are recognized if they have been acquired by customary law or written contracts.

Environmental Degradation

Environmental degradation in the Sahel has often been described in a linear fashion: increasing population pressure leads to environmental degradation, which leads to increased poverty. This rule applies not only to pastoralists, but to settled farmers as well. More recently, however, environmental experts and development practitioners acknowledge that multiple and complicated factors (political, economic, and social) contribute to environmental degradation and that herders employ a wide range of strategies to reduce environmental degradation as a threat to their livelihoods.

Environmental degradation is a decrease in the productive or regenerative capacity of an ecosystem. It is one of the largest problems facing Nigerien and Sahelian farmers and pastoralists today. One aspect of environmental degradation is soil degradation, which occurs when organic matter (trees, shrubs, crop residues) is reduced and soil is more exposed to wind or soil erosion, leading to a decrease in soil nutrients, reduced soil fertility, and diminished crop productivity. Even though pastoralists' practices have been blamed for environmental destruction, many rangeland ecologists and livestock experts now refute this claim, and current research shows that herding is not as environmentally harmful as previously assumed. They argue that in mountainous regions and arid or semi-arid areas, raising livestock is the best way to exploit resources and that "herbivores and vegetation depend on each other" (Toutain 2003, 2). The concept of permanent disequilibrium of the ecosystem in drylands is now accepted by many scientists. Disequilibrium ecology "rejects the central premise of equilibrium theory: return to the previous state." Instead, disequilibrium ecologists believe that "disturbance in the system results in a new state" and that "there is no perfect balance in nature to be disturbed. The natural condition of an ecosystem is imbalance and hence constant change" (Partridge 2005).

According to disequilibrium theory, mobility of pastoralists is essential not only for herders, but also for the ecosystem. Reduced mobility of herders leads to an increase in the amount of time animals are left in one area. Environmental degradation that can be caused by livestock is determined not by stock size, but rather by the length of time the animals stay in a field, especially at critical times in the growth cycle of certain grasses (Toutain 2003). Thus a decrease in accessible grazing land can lead to environmental degradation—a consequence not of the brazenness or carelessness of pastoralists, but of the modern economic, institutional, and social factors already described.

Little is known about how pastoralists design systems to use resources, such as harvesting, regenerating, and protecting trees (Gautier et al. 2005). It has been observed, however, in the north of Cameroon that herders maximize the amount of fodder harvested from trees, while simultaneously pruning to preserve the productivity of trees (Gautier et al. 2005). Fulani groups in Sierra Leone practice "shifting pasturage," allowing their animals to graze in one area for two to three years and then moving to other grazing lands, leaving the eaten pasture to recover for as long as 15 years. It is also argued that livestock "improve pastureland and increase the diversity of flora by dropping different kinds of seed in their dung as they move

[6] The "tragedy of the commons" occurs when individuals use and benefit from a resource—for example, pastureland—but this individual exploitation leads to a societal loss of public goods, such as environmental degradation.

from one area to the next" (Hammel 2001, 18). Pastoral campsites often have high rates of tree seed germination because animals have left large amounts of manure and the seeds have passed through their digestive system, preparing them for germination. In addition, because livestock consume dry grasses and straw in the dry season, livestock can reduce the frequency and severity of bushfires (Hammel 2001).

Policy Options

Policy History

Policy makers are beginning to recognize the need to develop policy solutions that reflect the reality of social, economic, and political processes (Gautier et al. 2005). Laws aimed at reforming land tenure for farmers have strong impacts on pastoralists' access to grazing land, their mobility, and natural resource management. Until the 1970s colonial and newly independent governments favored livestock development programs focusing on improving livestock health and water sources to allow for increases in herd size and to allow pastoralists to move to land previously unusable owing to lack of water in the dry season. In the 1980s projects focused on providing services, improving pastoral incomes, and developing pastoral community organizations. They did not, however, focus on how these improvements contributed to sustainable natural resource management (Behnke and Kerven 1994). Additionally, although pastoralists were the intended beneficiaries, many of these projects were carried out without their input or participation.

Securing Pastoral Land

As land management systems evolve in communities across Niger, policies should reflect today's realities and meet the needs of all stakeholders. Multiple solutions exist for ensuring that pastoralists have access to grazing land and corridors for traveling to grazing lands or markets, not only according to the law, but in practice as well. Other national governments have legally separated and divided land between pastoralists and farmers. Although this approach might protect access to land in the short term for pastoralists, it does not reflect the realities of combined crop and livestock systems in many areas. Separation of the two groups could also reduce the remaining symbiotic interactions in fields and in common pool resources, hurting both farmers and pastoralists. Contractual arrangements between pastoralists and settled communities that negotiate and define land use and land access are another possibility, but these contracts can be difficult to enforce.

Would a better option be to change national laws by redrafting the Rural Code? Not only are land tenure laws difficult to implement, but it is difficult to assure that all stakeholder needs are met. Problems with current land reform laws include ambiguous laws, a lack of capacity in local governments and communities, and invalidation of the rights of disadvantaged groups (Bloch and Foltz 1999). Some analysts advise that these problems are better addressed at the local level than through national policies. Strong partnerships and arrangements would be essential at the local level to maintain mobility and access to grazing lands for pastoralists.

Sustainable Use of Resources

Currently, decentralization is "still focusing on reinforcing the capacity and responsibility of settled communities to manage territories and resources where they live" and therefore reinforces the insecurity of pastoralists' access to land (Gautier et al. 2005, 337–338). Elements of decentralization include protecting public goods, establishing frameworks to govern natural resources, building local capacity for natural resource management, creating a mediation body to resolve conflict, and providing technical assistance. Examples of some local organizational structures for managing natural resources include district organizations, village committees, corporate organizations, and citizen organizations.

Larger questions, however, remain. For example, is it possible to coordinate the use of common pool resources among heterogeneous groups, and how can all stakeholders benefit from devolution of natural resource management? How can laws be written and enforced to protect natural resource management while also securing grazing lands? With multiple users possessing various goals, what is the incentive to use resources sustainably and assure that the "tragedy of the commons" does not take place? Questions include long- and short-term considerations of natural resource management as well. In some situations achieving one goal conflicts with the objectives of another goal (Bloch and Foltz 1999). For example, a settled community decides to conserve land around their village to assure their access to firewood, but pastoralists need to bring their animals through this land to get to market to sell animals for income. This scenario shows how

aiming toward conservation can clash with market integration and economic development.

Handling of Drought and Recovery

The 2005 Niger famine displayed the fragility of pastoral, agropastoral, and agrarian livelihoods alike. Pastoralists and agropastoralists currently have few options when there is a severe drought. Both they and their animals suffer its effects. After a drought it takes years for herds to recover their size and become productive again. In an attempt to regain capital after a drought, Fulani males who can afford to migrate go in search of work and send remittances home to their families. This strategy can be risky, because the trip can be expensive, finding work is not guaranteed, and some countries have become unwelcoming or even hostile toward foreign migrants.

Pastoralists can be protected from droughts by price protections when they bring their livestock to market in "distress sales," as they did during the 2005 famine. During that famine Oxfam funded livestock-purchasing programs (de-stocking) and food voucher-for-work programs. As part of the de-stocking program, Oxfam offered livestock owners substantially higher prices per cattle than what the market price at the time was (Oxfam 2005b). Another possible intervention to help herders through a drought is for the government to enter the market, buying animals from herders at set prices and then selling the meat at a sub subsidized rate. Not only would this benefit pastoralists, but it could also benefit food-insecure populations by offering them an inexpensive protein source. For a poor government, however, it would be an expensive proposition. Instead of programs that directly transfer food or work to pastoralists, another approach is to assure that fodder and grains are available to herders at prices they can afford through market channels (Behnke and Kerven 1994). To be timely, this approach would require a proactive system that includes market infrastructure and monitoring of market and weather conditions.

Economic Integration

Given that meat is currently the second-largest earner of export income in Niger, working to expand market possibilities could benefit both pastoralists and the government. As demand for livestock products rises in urban centers, markets could also be used to improve nutrition in food-insecure communities. Infrastructure and market information systems to integrate markets and prices are the foundation of a well-functioning market. Government policies that seek to promote market possibilities for new products, such as value-added products, could increase pastoralists' incomes. Other approaches that could increase output of products include building the input market for livestock raising. Strengthening the input market could be accomplished by creating seed banks and credit facilities and by offering technical training to pastoralists (Toutain 2003).

Change of Lifestyle

Sedentarization of pastoralists in East Africa has been promoted or imposed in all countries in the region at some time in their history (Markakis 2004). Some of these countries even include statements about settling pastoralists in their constitutions. This effort has been met with resistance in most places, as pastoralists are unwilling or unable to alter their livelihoods.

Attempting to refoster cooperation among pastoralists and farmers can have positive outcomes. Legislation alone does not always change people's behaviors, as shown by the lack of land tenure adoption in many areas. Appropriate education and enforcement mechanisms are needed, but these elements have not been undertaken in many parts of the Sahel. The devolution of natural resource management should also consider the ability of communities to cooperate. Greater cooperative capacity decreases pressure on grazing lands and leads to lower stock densities and higher herd mobility (McCarthy et al. 2004). On-farm cooperation could include symbiotic planting of crops, such as legumes, in sedentary farmers' fields, which could benefit herders through forage and farmers through increased soil fertility, weed suppression, and fire wood (Bloch and Foltz 1999). More research is needed on crop production that produces nutritious and abundant crop residues without sacrificing grain yields. Such production systems could also foster cooperation between farmers and pastoralists.

Improving Services

Health and education are essential for any basic development strategy. Since pastoralists and agropastoralists practice transhumance all of or part of the year, it can be difficult for them to gain access to essential services such as health care and schooling. A 2005 Oxfam report concluded that educational interventions that are community-based

and take into account the mobility patterns of pastoralists can be effective at educating pastoralist children. Oxfam also states that these interventions should be flexible, perhaps adjusting the school calendar to ensure appropriate timing or adapting the curriculum to ensure its relevance (Oxfam 2005a).

The same flexibility and adaptation would be required to improve pastoralists' access to health care. In many rural areas, people must walk hours to reach a health care facility with trained nurses. These facilities demand a fee for services, and although the fee is minimal, it is enough to exclude the poor. Options for improving health care for pastoralists include training certain members of nomadic communities in basic health care and setting up mobile health clinics at strategic places at strategic times of the year. Given that Niger's health infrastructure is weak and the government has limited funding, finding the money to implement these plans could prove difficult. To fill this gap, international NGOs have intervened to provide basic services to pastoralists, but their coverage is not as complete as government programs could be, because they often specialize in certain regions, nor is it assured that NGOs will fund these services for the long term.

Organizing Pastoralists

Since the 1980s there has been a push to create local pastoralist organizations, and in the 1990s multiple organizations were formed to attempt to represent pastoralists in the drafting of the Rural Code. The largest organization is the Association for the Regeneration of Animal Breeding in Niger, founded in 1991, which represents thousands of herders in southern Niger. Herder organizations have conducted educational campaigns for herders, lobbied officials for pastoralists' rights, represented herders in administrative and legal battles, and worked to address health and welfare issues (Hassane 2001). Although they have been successful in some of these areas, herder organizations face problems of lack of formal recognition by the government, a mistrust of the government administration, and limited financial and human resources to carry out their mandates (Hassane 2001).

Assignment

Your assignment is to create a policy package that would preserve the livelihoods of Niger's pastoralists. You must take into account the multiple needs and priorities of all of the stakeholders and design policies that can support all of these groups. You must also consider who has the capacity and is best suited to deliver these policy options.

Recommended Readings

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Chapter Seventeen
Farm Restructuring in Transition: Land Distribution in Russia (7-7)
by Eugenia Serova

Executive Summary

The agrarian reform of the 1990s in Russia was targeted at transforming the formerly state-owned and centrally planned agriculture sector to a market-oriented one. The reform dramatically changed farm structure and land tenure in rural areas. The preconditions of the reform prohibited land restitution, as took place in many Eastern and Central European countries in transition. Instead, the major instrument of Russian reform was land sharing based on the allocation of conditional land shares, which were not indicated on the ground, to the rural population. This fragmentation of landownership was not coupled with the fragmentation of farming operations: the big farm enterprises were preserved but had to rent small land shares from their holders. Moreover, in the late 1990s huge agribusiness companies entered Russia's agricultural sector and rented hundreds of thousands of hectares for cultivation.

Agricultural growth started to recover after 1998, but a severe contradiction between the system of fragmented land tenure and the prevailing large-scale farm structure remained. For agribusiness investors, the process of gaining access to land had become costly and prolonged, hampering the growth of investment, and consequently, growth in the agrifood sector.

The complicated systems of land registration laid a foundation for rent-seeking activity in land administration across the country, aggravating the problem of high transaction costs in the farmland market. On the other hand, the land share system provided the millions of rural dwellers with an additional source of income that was crucial given the severe fall in living standards stemming from the reforms in the countryside. The objective of increasing the efficiency of agriculture by consolidating land ownership thus contradicts the objective of protecting the civil rights of millions of land shareholders who were allotted their shares in the early 1990s.

Around this problem four groups of stakeholders were formed. Domestic and foreign agribusiness investors are interested in consolidating land shares in farm enterprises and simplifying the land registry system. The land shareholders are also interested in reducing land transaction costs, but most of them have benefited from the possession and disposal of shares. The private firms that offer consulting and land engineering services are profiting from the existing land registry system, land transactions, and plurality of parties in farmland transactions. The land bureaucracy has a strong background of rent seeking in existing land tenure arrangements.

Policy makers are debating several political options, some of which have already been introduced. The political challenge raised here is a typical one for the policy-making process—the contradiction between efficiency and social justice. The challenge is to find a compromise political decision that would balance the objective of economic growth in agriculture, which may require consolidating farmland in the hands of producers (which are mainly large in scale), with the objective of protecting the property rights of land shareholders, for many of whom these shares provide an important source of income.

Your assignment is to find a political solution that will (1) make agriculture attractive for investors (domestic and international) by simplifying land transaction procedures, and (2) secure the rights of rural dwellers who received land shares through the reforms. Take into account the farm structure and land tenure systems that emerged in Russia after the agrarian reforms of the 1990s, current stakeholders' interests and the distribution of political forces in Russia, and the possible opposition to change by rent seekers in the land registration system.

Table 1: Kolkhozes and Sovkhozes in Russia, 1987

Characteristic	Kolkhozes	Sovkhozes
Number of enterprises	12,124	12,810
Average arable land per enterprise (thousand hectares)	7.1	9.6
Average number of cattle per enterprise	1,930	2,018
Average number of employees per enterprise	354	461

Source: CSU 1988, 444–461.

Background

Russia, along with 27 other post-communist countries, undertook massive social and economic reforms in the early 1990s in an ambitious effort to shift from a centrally planned economy to a market economy. Agricultural transformation was an essential part of this transition, and one of the major goals of this transformation was establishing a new form of agricultural production.

Production Units in Soviet Agriculture

The agricultural system of the Union of Soviet Socialist Republics (USSR)[1] was formed in the 1930s during the collectivization process. At that time all individual peasant farms across the country were forcibly merged into collective farms (*kolkhozes*). The estates of large landlords were usually transformed into state farms (*sovkhozes*). Throughout the Soviet era, the *kolkhozes* and *sovkhozes* were frequently reorganized, merged, redivided, and transformed into one another, and thus by the end of that period they were almost indistinguishable. They were large agricultural enterprises with state-appointed managers and many employees (Table 1).

The farmlands were nationalized and allotted to these enterprises for permanent use, free of charge. *Kolkhozes* and *sovkhozes* also had other endowments from the state and had to produce in accordance with strict production targets set by the state bodies. Prices for agricultural inputs (such as machinery, chemicals, power, fuel, and fodder), outputs, and wages were set by the state. Farm profits were not an incentive for performance but rather merely the difference between state input and output prices. The major goal of production was to meet state targets. Naturally, such production units could not function in a market environment.

Besides *kolkhozes* and *sovkhozes*, there was another form of production in Soviet agriculture. In the process of collectivization, the peasants had been allowed to keep tiny plots and some livestock for subsistence needs. For decades these household farms were the means of survival for millions of peasants. A portion of the output from these household plots could be sold at town markets. Prices at these markets were regulated by demand and supply rules and were higher than state-regulated prices. By the end of the Soviet period, household farms produced around one-third of the country's overall agricultural output, although this share varied by region, increasing from the north to the south. Households sold less than 13 percent of their produce, however, and the share of household output in total marketed output was negligible.

The Collapse of the Soviet System of Agriculture

Soviet agriculture was always characterized by poor development. Agricultural productivity in Russia was very low for an industrial country, and food shortages were becoming an increasingly acute problem. In the final years of Soviet power, the situation with regard to agriculture and the food industry continued to deteriorate, with annual growth rates close to zero. The gap between artificially low retail prices for food products and steadily growing producer prices (combined with growing nominal household income) led to the need for both consumer and producer subsidies. These subsidies to the agricultural sector and consumers accounted for one-third of national expenditures and were rapidly becoming an unbearable burden for the country. Gas and oil exports

[1] Russia was one of 15 constituent parts of the former USSR and became independent after the break-up of the USSR in 1991.

had been the major source of funding for food subsidies for two decades, so the budget problem was further aggravated by the drop in world gas and oil prices in the mid-1980s.

Intensified attempts to reform the agricultural sector in the 1980s did not yield even temporary success, and the crisis in agriculture became a major contributor to the country's overall social and economic decline. Systemic reform of Russia's agriculture became an urgent national task. The primary objectives were to facilitate a fundamental change in agrarian relations in order to create an efficient sector and to relieve the budget burden imposed by the agrifood system (OECD 1998; World Bank 1993).

Difficulties of Farm Restructuring

The transformation of *kolkhoz*es and *sovkhoz*es into market production units was hampered by a number of circumstances.

First, after 70 years of collective agriculture, agricultural workers had become specialists who performed only one functional operation in farming, such as cultivating land, milking cows, or bookkeeping. They had lost the capacity for individual farming requiring complex skills and habits. The generation that could run individual farms had gone long before the transition period started. Numerous polls of the end of the 1980s showed that no more than 5 percent of the rural population wished to run their own farms. In addition, after the long period of Soviet power, land restitution[2] in rural areas was practically impossible: property rights were untraceable, documents were lost in the historical turmoil, and huge expanses of farmland were occupied by expanding towns or under water reservoirs for power stations. Consequently, the heirs of the peasants whose lands had been nationalized in the collectivization process could not be compensated as they were in the majority of the Eastern and Central European countries.

Second, the entire rural infrastructure, including agricultural machinery manufactured in the country, was tailored to suit large-scale farms. Russia produced predominantly powerful tractors and wide-cut equipment; roads and engineering infrastructure were adapted to the large-farm operations. This situation could not be changed overnight. Smaller, individual farms simply could not find the small and medium-sized machinery they needed for their plots. Detached from the parent collective or state farms, the individual farms were separated from the infrastructure and had to spend heavily to connect to power, water, and gas supply networks and to reach the main roads.

Third, the processing and food industry was also tailored to state-owned agriculture. In the paradigm of state-owned agriculture, there was no need for competition among purchasers of farm products. Therefore there was one dairy plant for each county[3] and one slaughterhouse for every two to four counties. In the transition to the market system, these enterprises had naturally and immediately transformed into monopolies (or more precisely, monopsonies), which dictated terms of trade for the suppliers. A system of farmer cooperatives and commercial middlemen could not emerge overnight.

Under these circumstances it was not feasible to simply split collective and state farms into individual farms.

So after the break-up of the USSR in 1991, the new Russian government was faced with the severe problem of restructuring farms and privatizing farmland. The major tasks of this transformation were formulated as the following:

- to transfer farmland from state ownership to private ownership in a socially acceptable and economically rational way; and
- to transform *kolkhoz*es and *sovkhoz*es into market-oriented production units.

Policy Issues

Land-Sharing Policy

The Russian land reform and farm restructuring were based on a procedure called land sharing. The

[2] Restitution is a legal process of returning or paying compensation for previously expropriated property. The collapse of communism in 1989–1991 made it possible to restore property in the former communist countries. Many countries enacted legislation to provide for the restitution of both private and communal property. In agriculture the most massive restitution effort was for land.

[3] The lowest level of administrative unit in Russia is called a *rayon* and is analogous to the U.S. county.

workers, as well as pensioners and social service officers, of the *kolkhoz*es and *sovkhoz*es received equal conditional shares in the land operation of the parent farms. The conditional shares were not marked on the ground and were to be considered as options. The holder had the right to withdraw with a physical plot at any time, without the permission of the other land shareholders; only the location of the plot had to be agreed upon. These land shares were transferable in all types of legal transactions and were inheritable. A person who accumulated a certain number of land shares could request from the parent farm a plot or plots of land equal to the total nominal size indicated in the shares.

In the reform of 1992–1994, around 12 million such shares were allotted to rural dwellers. The average size of the land shares varied significantly from region to region owing to uneven population density in different parts of Russia, but across the country shares averaged about six hectares. Because of the system of legally allowed land share transactions, the average size of family farms was bigger than one share—around 40 hectares per farm.

About 300,000 households exercised their right to withdraw from the farm enterprises and set up their own family farms. In the first years of the reforms, many people quickly withdrew from the *kolkhoz*es and *sovkhoz*es, but later the process stagnated, mainly owing to the reasons mentioned in the previous section (Table 2).

The rest of the rural dwellers preferred to maintain their original status as members of the *kolkhoz*es and *sovkhoz*es. In most cases they rented their land shares to the farm enterprises. Shareholders also had the option of contributing their land shares to the equity of these farms. In this case the shareholder would lose the right to claim a physical plot and instead become a shareholder of a joint stock company or co-op, but in practice shareholders rarely exercised this option.

The former *kolkhoz*es and *sovkhoz*es were gradually transformed into various types of business organizations. Originally the managers, workers, and pensioners owned these enterprises, but over time control of the stock was increasingly concentrated in the hands of top managers, and the enterprises were later acquired by outsiders.

Because of the country's weak legal culture and law enforcement, as well as its federal structure,[4] the land-sharing arrangements were inadequately registered. The shareholders were not aware of the benefits and responsibilities of possession, and the farm enterprises that truly used the lands did not pay for this use. Moreover, lands shares that were leased to large farm enterprises were not identified on a map.

This situation changed slightly after a 1996 presidential decree obliged all users of land to sign legal contracts with the owners of the land shares. Since then, the average size of individual farms has grown through the leasing of land shares. There are no official data on land share transactions among farm enterprises, but anecdotal evidence suggests that this process has occurred as well. Obliged to sign the formal lease contracts, the land shareholders were encouraged to choose better lease conditions. As such, a quasi-market for land shares sprang up.

Further development of the situation occurred after a financial crisis in 1998. The fourfold Russian ruble devaluation caused a notable trend toward import substitution and led to significant growth in agriculture during the following years. Thanks to this growth, potential investors considered land more valuable and demand for land rose. Under these circumstances the conditional character of land shares played a positive role in the development of the land market. Attracted by high net returns in agriculture, the external farming sector investors began to acquire farmland for operation. On the other side, the rural dwellers who were land shareholders had become aware of the value of their land and thus preferred not to sell their shares but to rent them advantageously. Therefore, the leasing of land shares became a major form of land acquisition in this period.

Farm Structure

In this post-crisis period a new form of producer emerged that is quite different from the main types of agricultural producers in other post-Soviet economies. These are the large farm operations (up to 300,000 hectares in several regions—much bigger than traditional Soviet *kolkhoz*es and *sovkhoz*es and their current heirs) established with

[4] Land tenure issues are a subject of both federal and regional legislation, and at the beginning of the reforms, a number of regions did not establish land-sharing arrangements on their territories.

Table 2: Development of Family Farms in Russia, First Years of the Reform

Characteristic	1991	1992	1993	1994	1995	1996	1997
Number of family farms (thousands)	49	182	270	279	280.1	279	274
Average size of plot (hectares)	41	42	43	43	43	44	48
Share of family farms in land use (%)	...	3.4	4.9	5.0	5.0	5.3	5.8
Share of family farms in gross agricultural output, (%)	...	1	2	2	2	2	2.1

Source: Calculated from Russian Cadastre Service data.
Note: ... indicates negligible.

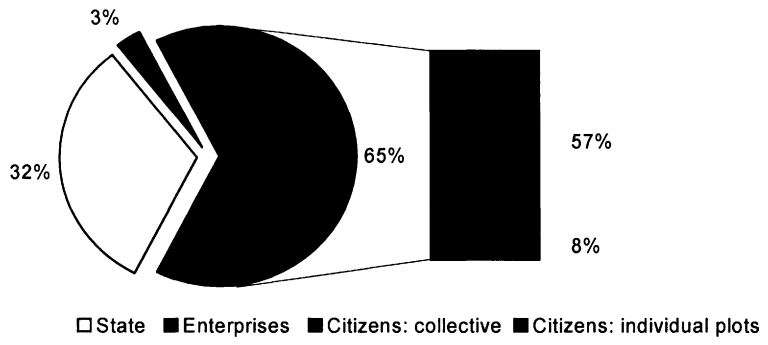
capital derived from outside the primary sector. Sometimes capital comes from a downstream sector (like processors, retailers, or middlemen) whose purchasers of agricultural raw materials want to invest in secure and reliable supplies. Sometimes it comes from an upstream sector (like manufacturers and suppliers of resources and services for the farming sector) whose suppliers tend to control the costs of inputs. Often capital originates completely outside the agrifood sector—mainly from the most profitable sectors of the Russian economy, such as fuel and energy, finance, and metallurgy. In some cases a holding company owns several farm enterprises, and in others the farm enterprise itself is simply one huge enterprise. Sometimes such companies are organized under the control of and with the participation of the regional or local administration. In the majority of cases, however, a large farm operation is a purely private initiative. Management structure differs tremendously from company to company. Land tenure arrangements also vary: a company may own huge areas, but more often they rent land shares that make up huge areas.

Thus, the land share system provided large farm companies with easy access to land. If the farmland had been divided into physical plots during the land reform, the big companies, which each now lease hundreds of thousands of hectares in several regions, would need to divert their finances from investments in productive activities to investments in land consolidation. Under current arrangements they can accumulate a large number of leased shares and then claim the lands of the corresponding farm enterprises for allocation in physical form, which allows them to get these lands in big fragments. Also the land share lease provides the local rural population with a certain level of subsistence. Given that about 60 percent of land shares belong to the elderly, rental of land shares provides an additional safety net system in rural areas.

So in the initial stages of reform, the agricultural system in Russia changed dramatically. As Figure 1 shows, currently 65 percent of farmland in Russia is privately owned (if land shares are considered private ownership) and 38 percent is owned by the state and municipalities.

As in many other post-communist countries, Russia's agriculture is based on three types of production units: (1) large-scale farm enterprises, the successors of *kolkhoz*es and *sovkhoz*es and various related farming companies; (2) individual farms, which are presumably possessed and run by one family; and (3) household plots of the rural and, to a minor extent, the suburban and urban population (these are tiny plots of land presumably used for subsistence food production, with some sales of surpluses over family needs). These types of production units are legally defined mainly by their form of registration. Large-scale farms are incorporated in one form or another; individual farms are specifically registered as such; and household plots, which are exempt from both business registration and taxation, are defined in terms of the documented allotment of a physical plot of land.

Figure 1: Farmland Ownership Structure in Russia, January 1, 2004 (%)



Source: Shagaida 2005

Weak legal and statistical definitions of these three types of farming entities do not allow them to be distinguished by physical size and economic turnover. Thus, some individual farms operate 3,000–5,000 hectares and employ more than 100 people, making them comparable in size to the typical Russian incorporated farm. On the other hand, some individual farms have no land under cultivation or pasture but are registered as individual farms and count as such in the statistics. According to the 2006 Agricultural Census, more than 30 percent of individual farms in Russia operate more than 2,000 hectares of farmland, whereas 17 percent have no land at all. In addition, there is little difference in actual ownership between these two types. A "large-scale" farm can be controlled by a single individual, whereas an "individual farm" is often owned as a partnership or even owned jointly and severally by unrelated persons. Because household plots are exempt from taxation, many owners of market-oriented small farms pretend that they own household plots, although in reality they cultivate 50–100 hectares of arable land.

Household plots accounted for more than half of total agricultural output in 2000, up from 30 percent in 1990. "Households," however, is not a homogeneous category: it amalgamates a number of dissimilar producers. From 40 to 70 percent of households generated barely 5 percent of the gross agricultural output of the corresponding county. These are very small subsistence farms with an average of 0.06 hectare and two head of cattle. The top 20 percent of households in some areas produce up to 25 percent of the gross agricultural output of the corresponding county, and these farms have an average of 30–40 hectares and sometimes exceed 100 head of cattle (Serova 2006). These latter farms are considered household plots but are presumably run by market-oriented, commercial producers who do not register as individual farms in order to avoid taxation and to obtain concessional services from an adjacent, large-scale "mother" farm.

Problems with Reforms

The agrarian reform of the 1990s led to a number of problems for the further development of the sector.

First, the reform led to a situation in which agricultural businesses and the land operated by the businesses belonged to different groups of owners. The farming companies leased their lands from a large number of land shareholders. An individual land shareholder could break a rent contract at almost any time, making agribusiness risky and discouraging agribusinesses from making land improvements and long-term investments. Also, the process of collecting shares and contracting with such a large number of holders increased the farming companies' transaction costs. Thus, for an operation of 100,000 hectares (a common size for large agricultural companies in southern Russia), the managers had to arrange legal contracts with about 15,000–20,000 people. The lack of a well-functioning legal system made registration procedures a nightmare for involved parties (Shagaida 2005).

Second, the fact that agribusinesses did not own the land prevented them from using it as collateral for bank loans, thereby reducing the potential of agriculture to attract borrowed capital for long-term investment projects.

Third, because of the land share system, a buyer who purchased a large farm enterprise did not know the final result of his or her purchase. In the formal deal only nonland assets could be acquired; land arrangements remained uncertain. After purchasing the farm, the new owners have to arrange new land lease contracts with all of the land shareholders. This system generated much uncertainty for would-be investors and discouraged them from making purchases.

Together, these three problems significantly reduced the capital inflow to agriculture, which desperately needed investment for modernization, and hampered the sector's potential growth. Agricultural productivity, low during the Soviet era, deteriorated even further during the transition period because of a financial crisis that led to severe decapitalization of farms and dramatic reductions in input use, as illustrated by fertilizer use (Figure 2).

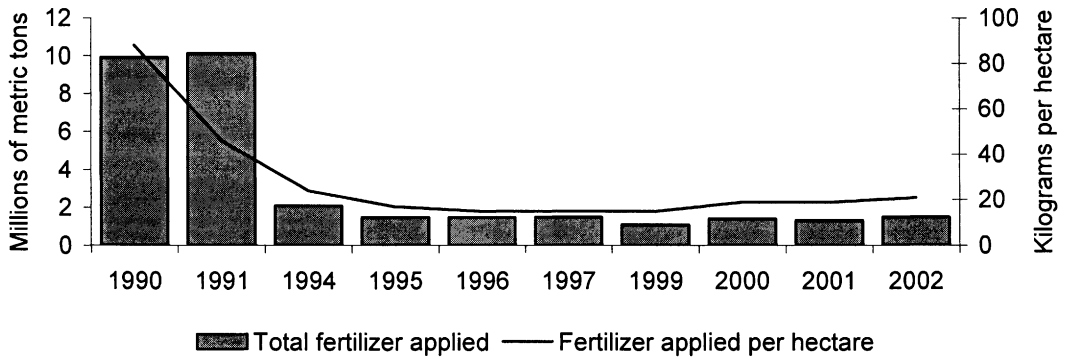
Fourth, the conditional nature of the land shares helped the land turnover mechanism, but also set up insoluble problems for land registration. The physical plot allotted for the purpose of renting a particular land share could be identified differently depending on the entity that rented this land. Thus, if a land shareholder rented his or her share for a year to a farmer located in the same village, then a physical plot near this village would be allotted. If the same land shareholder rented his or her share the following year to a large farming company that set up its operation in a remote area, then the physical plot would be allotted close to this operation. This system was a disaster for maintaining a land registry, but land registration is a necessary element of transparent and efficiently functioning land market (Shagaida 2005).

Now policy makers in Russia are faced with the challenge of further reforming the land tenure system within the given farm structure.

Stakeholders

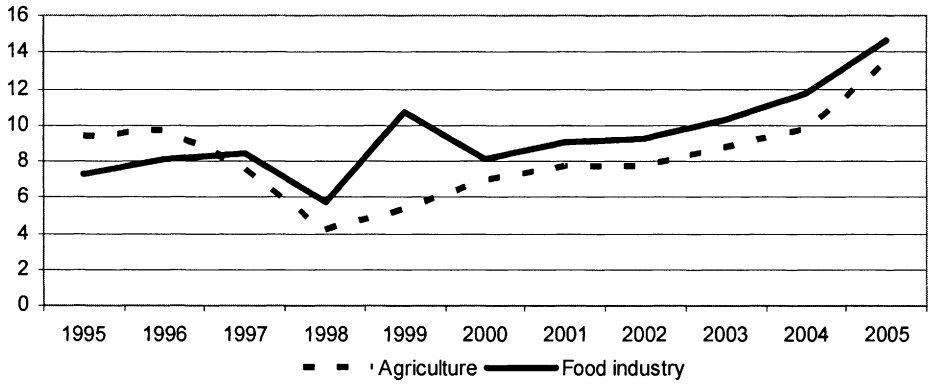
Many groups of interests with different political power are involved in solving the land tenure problem in Russian agriculture. One of the major stakeholder groups consists of the owners of big farming enterprises. Since 1998 Russia's agriculture has grown quickly and attracted investment from outside the sector (Figure 3). The external investors are interested in easier access to land, given the current long and costly process of leasing small shares from thousands of holders. These external investors belong to the strongest financial and industrial groups in the Russian economy, including the largest mineral oil companies, metallurgy companies, railways, and banks. These companies have substantial lobbying power and can promote political decisions in their favor.

Figure 2: Mineral Fertilizer Use, 1990–2002



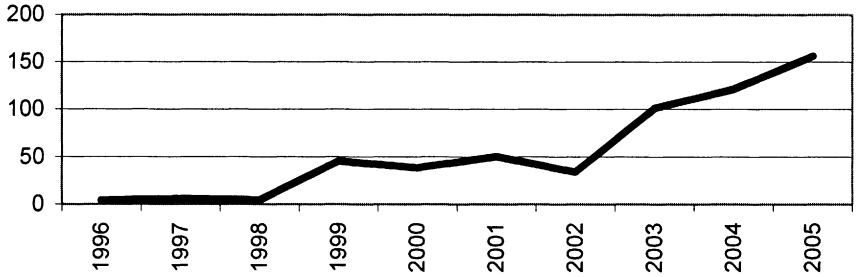
Source: Serova and Shick 2005.

Figure 3: Direct Investments in the Agrifood Sector in Russia, 1995–2005 (billions of rubles in constant 1995 prices)



Source: Calculated from Federal State Statistics Service data.

Figure 4: Foreign Investments in Agriculture in Russia, 1996–2005 (millions of U.S. dollars)



Source: Calculated from Federal State Statistics Service data.

Apart from domestic investors, there are growing investments from international companies into the Russian agrifood sector and primary agriculture (Figure 4). Foreigners are not allowed to own farmland in Russia, in accordance with Russian legislation, but they can be the co-owners of farming enterprises with Russian partners who do own land. Thus, foreign agribusiness investors in Russia are also interested in consolidating land in the equity of farming enterprises and in simplifying large investors' access to land.

Another group of stakeholders consists of owners of individual farms, which vary dramatically by physical and economic size. The biggest individual farms accumulate their lands by renting shares, just as the big farming enterprises do, and therefore they have the same interest in land tenure development. Politically, however, the owners of individual farms are poorly organized and can hardly lobby for their interests.

The land shareholders constitute the most numerous group of stakeholders in this process, but they are extremely heterogeneous. Some shareholders have already made their decision about how to dispose of the shares. They had a choice between withdrawing with their physical plot and establishing their own farm, renting or selling their share, or contributing the share to the equity of a farming enterprise. Most of the land shares have been transformed into plots during the years of reform.

Thus, future reform of land legislation can affect only those shareholders whose shares are rented out and whose rights to these shares can be truncated by changes in legislation. The shareholders are disconnected geographically, have no political unity, and probably will not be able to argue strongly for their interests.

There is one more group of stakeholders that includes the officers of the national land registry and the employees of the commercial land engineering companies and land consulting companies. Complicated procedures for registering land transactions create demand for the services of private consultants and land engineers. Moreover, these procedures also lay the foundation for rent-seeking activities by government officers involved in the land registration process. This group will likely oppose radical changes in the system.

Policy Options

The first and most obvious option, which was partially implemented in legislation of the early 2000s, is to stop renting land shares. Before rental, the conditional land share should be withdrawn from use by the parent farm, identified on the ground, and registered as a physical plot. Only after that should it be rented out. If several land shareholders are intending to rent their plots together to the same renter, they should undertake land consolidation.

A consequence of this option is that individual shares are not requested for rent because the big farming companies are the major leasers of the land shares. Land shareholders thus actually lose the right of individual rent. Most often the entire group of co-owners of land within one former *kolkhoz* or *sovkhoz* rents its shares out together. Individuals lose their share of the rent payments because the group decides collectively how to use these receipts. As a result the safety net role of the land share system is destroyed. In addition, the leaders of the group get a special role in the rent negotiation process, a practice that clears the way for fraud and rent-seeking activity (or "under the table" deals) that also reduce rent revenues for the ordinary land shareholders.

On the other hand, the legal requirements for preliminary land allotment, identification on a map, and registration increased the transaction costs for land rental enormously. These costs are not affordable for the shareholders and usually are undertaken by the leasers, who are large companies. These companies thus face increased costs to gain access to land and consequently a reduction of potential investments in production.

New land legislation in the early 2000s made land turnover much more difficult. Today, big investors tend to buy farm operations from other big companies that have completed all the necessary legal arrangements or from the state or municipalities.

Other debated policy options are related to the different ways of depriving land shareholders of their ownership. There is a certain rationality to this seemingly unfair proposal. Many agricultural enterprises are in serious need of investment. Around 40 percent of farm enterprises in Russia consistently operate at a loss. Consequently the wages of employees on such farm enterprises are low and irregularly paid; furthermore the poor performance of these enterprises leads to the deterioration of the entire rural infrastructure around them and a decline in the living standards in nearby villages. Under these circumstances land shareholders do not get the benefits of their land ownership. Consolidation of their lands in the equity of farm enterprises could make these enterprises more attractive for external investors. The inflow of investments and better management could improve not only farm performance and employee wages, but also rural life in the surrounding area. So even if they lose the property rights associated with their land shares, the shareholders could ultimately benefit anyway.

The Constitution and general principles of justice do not, however, allow policy makers to truncate the rights of the citizens once given. In the reform process 12 million rural dwellers received land shares. Some of these shareholders disposed of their shares successfully: some established their own farms and run them efficiently; some invested their shares in well-performing big farm enterprises and receive dividends or rent; some sold their shares and used the capital for other purposes. How successfully shareholders were able to dispose of their land shares did not depend exclusively on personal choice; much was determined by the region where the share was located (in marginal areas there were few options for using land shares efficiently), by the performance of the parent farm enterprise, by regional policy (in some regions share allocation was postponed by the local administration), and other factors. Under such

circumstances it would be unfair and politically unacceptable to dispossess all these shareholders. Thus the major political challenge on this issue in Russia is achieving a compromise between the efficiency of agriculture and social justice in rural areas.

Assignment

Your assignment is to find a political solution that will (1) make agriculture attractive for investors (domestic and international) by simplifying land transaction procedures, and (2) secure the rights of rural dwellers who received land shares through the reforms. Take into account the farm structure and land tenure systems that emerged in Russia after the agrarian reforms of the 1990s, current stakeholders' interests and the distribution of political forces in Russia, and the possible opposition to change by rent seekers in the land registration system.

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Chapter Eighteen
Biodiesel and India's Rural Economy (7-8)
by James Rhoads

Executive Summary

With annual economic growth rates of more than 7 percent and a population of well over a billion, India has a huge amount of global clout, both economically and environmentally. Although this recent economic growth has lifted millions out of dire poverty, millions more remain marginalized from the booming economy, and India will require massive amounts of resources to achieve its goal of reaching the status of a "developed" nation. Moreover, this growth must be achieved sustainably to prevent the short-term impacts from being overshadowed by long-term environmental degradation.

Alternative energy sources will play a role in maintaining economic growth while also addressing the growing concerns about sustainability. Biodiesel, a plant-based substitute for fossil diesel, reduces the carbon dioxide, carbon monoxide, and particulates emitted from internal combustion engines. It is a technology that can reduce dependence on oil imports and the negative environmental impacts of burning fossil fuels, while at the same time offering potential growth in the rural economy. The government of India argues that biodiesel production, especially from the planting of *Jatropha curcas* on degraded or marginal lands, could play a significant role in addressing these economic and environmental concerns while also creating a vibrant new rural industry. A major initiative is currently underway to simultaneously develop the production capacity of inedible oilseeds from *Jatropha curcas* and the infrastructure required to process the seed oil into biodiesel for use as transportation fuel. Thousands of jobs could be created, and millions of dollars could go to the struggling rural economy. There is little reason to question the continued growth of the oil market, and capturing a share of that market could offer enormous economic benefits to the rural sector.

This case presents some of the difficulties and potential pitfalls of achieving those goals. These difficulties include technological and structural issues of production, such as developing the appropriate equipment and infrastructure for oilseed production and expelling, converting the oil to biodiesel, and developing end-user equipment. Ecological issues concern the lack of scientific information on the chosen species, including long-term research on agronomic issues relating to pests and disease, production techniques, and breeding of productive genotypes. Finally, social issues concern the development and implementation of appropriate policies and incentives that protect vulnerable populations from potential harm, in the form of lost labor opportunities, unfamiliar new markets for seed crop sales, and the potential for changing food prices due to displacement of less profitable food crop production. In conclusion, oilseed development policy must take into consideration the production limitations of individual small farmers, while still encouraging the sector to grow large enough to allow for economic production of biodiesel and to make a real environmental impact.

Your assignment is to recommend to the government a policy to guide the development of biodiesel that takes into account the interests of the various stakeholder groups.

Background

The Booming Indian Economy

The perception of the role that India will play in the future global economy has changed dramatically in the past 15 years. Since India liberalized its economy in 1991, the real growth rates of gross domestic product (GDP) have remained consistently greater than 5 percent (7.6 percent in 2005) and created a society that is moving in the direction of high mass consumption. Given that the population is well over a billion people (one-sixth of the world's population) and still growing at 1.93 percent annually, the potential amount of resources that will be needed to feed the continued growth will be enormous. Despite these impressive economic growth rates, more than 25 percent of the

population lives below the poverty line, with rural poverty rates at 30 percent or more. More than 20 percent of the national population is still undernourished (Government of India 2002). A continued effort must be made to include these segments of the population in future economic planning so that they can also access the opportunities of growth and not fall further behind.

One influential variable in the future growth of this booming economy is the energy sector. Meeting the demand for energy for residential and commercial needs will prove challenging. The focus of this case study is transportation fuel, and specifically the production of biodiesel from an oilseed-bearing shrub called *Jatropha curcas*. With the demand for transportation fuel growing at 6.8 percent a year, it is projected that by 2020, India will become the third-largest consumer of transportation fuel in the world, after the United States and China. The number of vehicles on the road jumped from 20 million in 1991 to 50 million in 2000 (Government of India 2002). Not only has the growing middle class begun to demand personal vehicles, but the growing urban population has an increasing need for transportation as well. The number of two-wheelers and autorickshaws (most of which run on highly polluting two-stroke engines) in cities of more than 100,000 people is expected to climb from a rate of 102 to 393 per 1,000 inhabitants in the next 20 years (Francis et al. 2005). Also, the demand for transportation of goods and raw materials by commercial carriers will continue to grow with the economy. Although biodiesel production can address only a small portion of this demand, it is certain that the aggregate demand for transportation fuel will only continue to increase.

Concerns for the Future

Beyond the question of quantity and availability of energy sources are several other concerns. The first concern is insufficient domestic fossil fuel resources. In 2003–2004 India imported 70 percent of its crude oil at a cost of US$18.36 billion, and it can only expect these numbers to grow. The greatest increase in demand is in the transportation sector, which meets 95 percent or more of its needs from fossil fuels (Kumar and Mohan 2005). Diesel fuel accounts for 40 million tons annually, constituting 40 percent of the overall fossil fuel market. Diesel's share in the market is growing at 5.6 percent per year and was expected to reach 52.32 million metric tons by 2007 (Dhawan 2004). All countries are beginning to recognize the threat of the unstable world crude oil market and are positioning themselves to gain access to the remaining global oil reserves. Indian policy makers must deal with the fact that most of their oil comes from the highly volatile Middle East and is therefore subject to the price fluctuations inherent in that region's instability.

A second concern is the environmental impact of the combustion of fossil fuels. Although per capita emission of air pollution in India remains low, the sheer volume of people requiring energy resources has exacerbated the problem to the point where India has become the world's fifth-greatest emitter of carbon dioxide (Government of India 2003). Urban areas are most affected by air pollution because of the high density of internal combustion engines. New Delhi has the fourth-worst air quality in the world, and 70 percent of that pollution comes from the transportation sector, leading to the results of one dramatic study that attributed an average of one death per day to air pollution in that city (Government of India 2002). Since 1998 major legislative efforts have been undertaken to combat these issues, including banning all diesel carriers within city limits, a forced transition to compressed natural gas (CNG), and a requirement to update all publicly or privately owned vehicles in the public transportation fleet, such as the autorickshaws. These measures have improved air quality considerably, but as the absolute number of vehicles continues to rise, pollution is sure to follow, regardless of efficiency measures.

A third concern for the energy sector regards the inevitable eventual shift away from fossil fuels. Although present needs for transportation must be met, every investment in current technology is one that will continue to contribute to the existing problems. The present fleet of vehicles will grow increasingly inefficient with age, and the sources of air pollution will only multiply as the demand for vehicles grows. Interim solutions, such as biofuels, as well as long-term solutions from new technology, must be explored.

The Role of Biofuels

To combat these global problems, many governments are promoting the development of biofuel technology. Biofuels are simply any fuel derived from recently living matter. Wood could even be considered a biofuel, but this case will focus on the

two forms of biofuels that are being developed specifically for use as transportation fuels: ethanol[1] and biodiesel.

Ethanol is alcohol distilled from plant carbohydrates, such as sugarcane, sorghum, or corn, that can be used as a fuel or fuel additive. With minor engine modifications ethanol can be used as fuel at 100 percent concentration, or with no engine modification it can be blended with petroleum gasoline in various percentages. Ethanol offers many benefits, such as reducing emissions and dependence on imported oil, while also developing the agricultural economy. Substantial growth in ethanol use has taken place worldwide. Thanks to massive amounts of available arable land and water, as well as long-term programs promoting the development of a supporting infrastructure and industry, Brazil has emerged as the global leader (Goldemberg et al. 2004). India has similar programs that guarantee certain levels of production and legislate a certain mixture of ethanol and petroleum gas at the pump. By 2003 a blend of 5 percent ethanol had become mandatory in nine states, and it was to be expanded to the rest of the country and increased to a higher percentage mix within a few years (Francis et al. 2005). Although there is certainly a future for ethanol production in India, especially considering the use of alternative feedstocks (such as sweet sorghum or other grasses) or improved technologies (such as cellulosic ethanol), the programs thus far have been criticized for questionable overall rates of energy production and the use of agriculturally productive land, water, and other resources for fuel production in a country with large numbers of food-insecure people.

The other biofuel, biodiesel, consists of fatty acid ethyl or methyl esters derived from plant oil, which can serve as a replacement for or additive to fossil diesel and can be used in compression ignition diesel engines with little or no modification. Virgin or used plant-based oil is converted to biodiesel through a simple chemical process called transesterification, in which alcohol replaces the glycerin from the oil molecules. A catalyst, in the form of an acid or a base (bases such as potassium or sodium hydroxide, called "lye," are commonly used), and alcohol (ethanol or methanol) are added to the oil at approximately 15 percent by volume, resulting in a separation of the oil into biodiesel and glycerin. As it did for ethanol, the Indian government planned to legislate mandatory mixes of biodiesel and petroleum diesel beginning in 2005 (Government of India 2003) with the intention of increasing the number of regions under this legislation and the percentage amount of biodiesel over time in order to promote the development of both public and private enterprises in various aspects of biodiesel production.

Given that production of biodiesel will never be able to entirely displace fossil diesel, the use of biodiesel as an interim technology, which takes advantage of and improves upon the existing infrastructure, is certainly worthy of the government's interest. The benefits of biodiesel can be divided into two categories: (1) environmental and (2) economic.

Environmental benefits of biodiesel. Fossil diesel has many negative characteristics that can be remedied by the inclusion of biodiesel in the mixture. B20 (a 20 percent biodiesel/80 percent fossil diesel mix) is accepted as a reasonable clean fuel alternative by the U.S. Department of Energy and has been shown to reduce emissions of unburned hydrocarbons, carbon monoxide, and other airborne toxins owing to its higher percentage of dissolved oxygen, which causes a more complete combustion (U. S. Department Energy 2006). A major problem with diesel technology is particulate emissions, which are reduced by 25–50 percent in B20 blends. Sulfur must also be added to fossil diesel to lubricate injectors but is unnecessary in biodiesel, and therefore sulfur emissions are reduced or eliminated. All of this is accomplished without a substantial loss of engine power or efficiency (Government of India 2003). A U.S. Environmental Protection Agency report found that biodiesel production eliminated lifecycle CO_2 emissions and called it "carbon-neutral," meaning that unlike fossil fuels, the net carbon accumulated in the growth of the plant and then released again via combustion results in a net gain or is neutral (Francis et al. 2005). Use of biodiesel thus leads to a reduction or stabilization of greenhouse gas emissions and could play a role in international environmental treaties such as the Kyoto Protocol.[2] Production of biodiesel also has

[1] This case is not directly concerned with the use of ethanol for fuel, but this information is needed for background context. The rest of the case will focus on biodiesel specifically from the production of *Jatropha curcas*.

[2] The Kyoto Protocol is an amendment to the international treaty on climate change, assigning mandatory targets for the reduction of greenhouse gas emissions to signatory nations.

possible beneficial environmental impacts, such as wasteland reclamation, reforestation, soil erosion control, and improvement of soil organic matter, depending on which plant sources are chosen and how the oil-bearing plants are grown.

Economic benefits of biodiesel. Economic benefits can be further divided into two: (1) reducing negatives and (2) inducing positives. The chief negative that could be reduced is the dependence on imported crude oil. The less the Indian economy is reliant on unstable, fluctuating, and politically volatile global oil markets, the better. The U.S. Department of Energy claims that the overall energy efficiency of biodiesel, as produced in the United States with soybeans as feedstock, is approximately 3.24 units of energy produced for every one unit spent in its production (U. S. Department of Energy 2006). This calculation is often the greatest point of contention for other forms of bioenergy in which the energy benefit margin is much more questionable. And the potential for less energy-intensive means of biodiesel production is much higher in India.

The main induced positive is the amount of capital that remains in the domestic economy. The money would likely encourage the development of local entrepreneurs and industry and could greatly benefit the agriculture-based economy, especially in rural areas. Farmers are generally interested in anything that can increase profits, such as a potential new market in biofuel feedstocks. The increased capital could mean added labor opportunities for the rural poor as well. Biodiesel could also be used for purposes other than transportation, such as for rural electrification, for cooking (instead of polluting biomass fuels like wood or manure), or for irrigation pumps. All of these uses could have positive impacts on rural, oil-producing communities.

The Government Scheme for Biodiesel Production

Recognizing the environmental and economic benefits of biodiesel as well as the difficulties of bringing together all the necessary components, the government of India has designed a plan for promoting the cultivation of inedible oil–producing plants for the production of biodiesel, focusing on a shrub called *Jatropha curcas.* Certain mutually dependent factors must all be in place for the commercialization of biodiesel technology, including, but not limited to:

1. reliable, efficient agricultural production of sufficient oilseeds;
2. infrastructure for seed collection, oil expression, and biodiesel conversion and distribution, among other things; and
3. economic incentives for all parties.

The plan. To help the production of biodiesel reach a reasonable scale,[3] the government has initiated a program to facilitate the activities of rural communities, entrepreneurs, and oil companies. This effort is intended to "demonstrate the viability of the program with all its linkages in different parts of the country and widely inform and educate the potential participants and stakeholders" (Government of India 2003, 119). The program has been designed to occur in two phases and is to be coordinated by the Council of Scientific and Industrial Research (CSIR)/Central Salt and Marine Chemicals Research Institute (CSMCRI), a major government research organization, and DaimlerChrysler, a multinational company (Francis et al. 2005).

Phase I began in 2003 and will last until 2007 with a budget of 1496.16 Rs. crore (approximately US$300 million). The initial goals were to establish nurseries, plant the trees, establish the initial seed expeller and transesterification centers, and finance research and development on improving the agronomic and production processes that currently limit profitability. The explicit goal of this stage was to "prime the pump" for private investment and establish markets using public funds, but this stage also included private investment on all levels, especially by oil companies at the processing phase in order to tap into existing distribution infrastructure. There were to be demonstration plantations covering a total of 400,000 hectares in eight regions. Each site was to have approximately 50,000–60,000 hectares of coverage, or the amount needed to produce the 80,000–100,000 tons of feedstock necessary for an economically scaled transesterification plant. Four selected sites in four different states were to be on designated forestlands and were to be implemented and managed by Joint Forest Management (JFM) Committees[4] and the Department of Social Forestry.

[3] The Indian government has a stated goal of achieving a 20 percent biodiesel/80 percent fossil diesel mixing capacity by 2012 (Government of India 2003).

[4] JFM Committees are management organizations made up of both local stakeholder representatives and government foresters.

The remaining four sites were to be on nonforest lands, including on marginal farmland, in farmers' fields as live fencing, and on public lands along roads, highways, canals, and railroad tracks.[5] This second set of sites has been selected for strategic reasons and will be implemented by nongovernmental organizations (NGOs), self-help and user groups, cooperatives, public and private partnership bodies, and perhaps other entities. In addition to the designated sites, funding will also be available to develop plantations on other lands, including *panchayat*[6] land and areas already involved in other development programs such as watershed development projects. This oil would be available first for use by the rural community, with surpluses being sold to processing units.

Phase II, beginning in 2007 and ending by 2012, assumes that farmers will have a positive experience during the initial phase and will be interested in continuing their involvement and in geographically scaling up to meet the intended goals. This phase is intended to be entirely self-funded while still maintaining the more successful efforts initiated during the initial period. Some government loans and subsidies may be necessary, as well as continued research and extension.

Why Jatropha curcas? Jatropha curcas is a small tree belonging to the Euphoribiaceae family. It is native to Central and South America, but it has been naturalized in India for many generations and is grown in many other countries throughout the tropical world. Many of its characteristics make it a logical choice for biodiesel.

- *J. curcas* is an incredibly robust plant. It grows in areas with as little as 300 millimeters of annual precipitation and has been seen to tolerate periods of drought by shedding its leaves to reduce transpiration (its leaves then add to the soil organic matter and improve soil health).
- It appears to flourish in even the worst soils, including acidic, alkaline, saline, sandy, gravelly, and nutrient-poor soils, although soil quality will certainly affect the yield of oil.
- As a wild plant it has few known problems with diseases or pests, including roaming livestock, which will not eat it, and therefore would require much less effort in the form of maintenance. As a result *J. curcas* is popular as a "live fence" for blocking livestock's access to certain areas.
- *J. curcas* is fairly easy to propagate—either by seed, vegetative cuttings, or, more recently, tissue culture—which lends it to easy dispersal.
- In nonintensive contexts it grows fairly quickly and begins to yield in the first year under ideal conditions, reaching maximum yield by the fifth year, and it has been reported to produce for 30 years or more.
- The oil produced is of the right quality and is of sufficient quantity (~30 percent oil by weight of seed) for biodiesel. The oil is inedible, and therefore its use as a fuel source, rather than for human consumption, seems reasonable in a country that has a serious edible oil deficit. Tests have shown that the oil is suitable for biodiesel production, and with a reasonable yield it could prove economically feasible to grow.
- The processed seed and byproducts create several marketable products. The seedcake (the dry material left over after the expelling of the oil) is an outstanding soil amendment, with a high mineral and nutrient content, and even has some advantageous pesticidal properties against soil nematodes and vector snails. If the process for removing the toxic content can be commercialized or if robust, nontoxic genetic strains are identified and distributed, the seedcake could also be used as high-protein animal feed. In biodiesel production, glycerin is created as a byproduct and can be sold for commercial industrial usage or soap production. *J. curcas* products have also been used in numerous countries for medicinal purposes, such as purgatives, which could prove to be another source of income from its production (Francis et al. 2005).

[5] Indian Railways, a publicly held company, is the most extensive rail system in the world, carrying more than 1 million tons of freight and 14 million passengers daily. It is the nation's single largest consumer of diesel fuel and the largest potential consumer of biodiesel (http://www.indianrail.gov.in/).

[6] *Panchayats* are a collective form of governance among rural villages in India. They usually consist of five villages including a central village (*Encyclopedia Britannica* 2007).

Policy Issues

Ecological Issues

The somewhat anecdotal information about *Jatropha curcas* from government promotional materials (Government of India 2005) may suggest that the species is a miraculous silver bullet. A closer investigation reveals several possible pitfalls.

A limited-purpose plant? Jatropha curcas presents a concern for food security because it is in some ways a limited-purpose tree. Although it provides some secondary benefits to the grower (shade, soil organic matter, erosion prevention, and fencing, as well as some of the other benefits already listed), at present it offers little or no direct economic benefit to the farmer except for oil production and the seedcake as fertilizer and pesticide. Some of the same traits that make the species attractive for biodiesel reduce its popularity with rural people with limited resources. For example, the currently available genotypes of *J. curcas* contain toxic phorbol esters and also some antinutrients such as lectins and trypsin inhibitors, which make the oil inedible and the leaves unusable for fodder (Becker and Francis 2005). If farmers do not have access to proper technology, inedible oil is of little use to them beyond use in small oil-burning lamps. The oil is also a potential danger because there are reasonable concerns about accidental consumption and the physical risk of handling the toxic seedcake. Technology to allow farmers to use the oil directly, such as for powering cooking stoves, grain mills, or irrigation pumps, is being developed but is not currently available and will likely be expensive for rural communities. Also, the wood is not dense and is therefore useless as fuelwood or lumber. These issues may affect farmers' willingness to plant *Jatropha curcas* as a primary source of income.

A wild plant? Although *Jatropha curcas* has grown in India for many generations, little is actually known about it on a scientific level. In many ways it is still a wild plant, and some in India consider it a weed (Raju 1998, 132). India has suffered from the introduction of numerous other weedy or invasive exotics, such as *Prosopis juliflora,* a tree introduced by development agencies for reforestation and fodder production that now dominates much of the landscape with its thorns and invasive weedy tendencies (Raju 1998, 5). Although there is little evidence that *Jatropha* could cause similar problems since it has become naturalized in many areas, such problems are not out of the realm of possibility. At the very least, *Jatropha curcas* could prove to be a biodiversity concern if planted in vast monocultures.

Much research is currently underway, but little is known about basic agronomic best practices, such as spacing, pruning, and maintenance, the potential yields of *J. curcas* on various qualities of soil and in various agroecological contexts, and the potential for pests and diseases as production is scaled up into large plantations. Much of the data on which the cost-benefit analyses are based are not from large, intensive plantation settings that could achieve economically sustainable yields.

Perhaps most important, to achieve higher and more reliable yields, researchers are using better land and more inputs in the form of fertilizer and irrigation water (Tamil Nadu Agricultural University, personal communication), but these inputs then detract from the overall ecological and energy efficiency of the crop. This practice also raises some concerns about the use of higher-quality arable soils for the production of energy crops, which in certain circumstances may displace food crop production. To achieve reasonable ecological and financial profit margins, farmers will also need high-quality genetic material to improve the quality of planting stock for particular growing conditions as well as to raise the percentage of oil content. Because most farmers would be propagating from seed and because *J. curcas* is an open-pollinated plant, there is potential for significant genetic diversity between individual plants, in which some plants produce high yields next to others that barely produce at all (Francis et al. 2005). Large-scale breeding and nurseries will be necessary to reduce the variance in oil production and to select out less-productive phenotypes. This type of breeding, along with the dissemination of plant material and information, takes many years and serious public investment.

Social Issues

In promoting this new technology, the India Vision 2020 planning document claims that an optimistic scenario in which 10 million hectares are planted with *Jatropha curcas* could lead to production of 7.5 million metric tons of fuel annually and year-round employment for 5 million people. Moreover, the advantage of biofuels "is that they can generate tens of millions of rural jobs and stimulate enormous growth for rural incomes, especially among the weaker section. Therefore, these strategies

should not be regarded from the narrow perspective of energy alone, but from the wider perspective of national development" (Government of India 2002, 74). Perhaps the most important question for policy makers is how will these programs really affect people in these regions? There are a number of legitimate concerns.

A pro-poor technology? Helping the poorest of the poor escape from poverty traps continually proves to be an elusive goal. For biodiesel production to be economically feasible, the price must remain lower than that of fossil diesel. The net price of biodiesel depends heavily on the production cost of the feedstock oil, which in turn depends on the cost of rural labor to plant, maintain, and harvest the trees. The seeds must then be processed to expel the oil, which is converted to biodiesel. For the sake of economies of scale, the government plan envisions processing plants that that can expel 7,500 metric tons of oil a year and produce 100,000 tons of biodiesel through transesterification a year. Assuming a conservative rate of recovery of oil from seed of 28 percent, it would take 3,571 kilograms (kg) of seed to produce one ton of oil. Assuming a cost of US$0.11/kg for seed and processing costs of approximately US$19.60/ton, the overall cost of production would be approximately US$407.80/ton, which translates to US$0.53/liter of biodiesel. The sale of the glycerin and seedcake byproducts could optimistically reduce the net cost to approximately US$0.40/liter. Even though this is considerably lower than the cost of production of biodiesel in Europe, for example, it is still higher than the untaxed base price of fossil diesel in India, which is approximately US$0.35/liter (Francis et al. 2005).

This cost analysis illustrates two effects: (1) the government would have to not only pay to promote the production of biodiesel, but also forgo taxes on biodiesel in order for it to remain competitive;[7] and (2) a large portion of the profits from biodiesel production will be captured at higher levels of the value addition chain. As such, most of the profits will not be accessible to wage laborers or smallholders involved in production. In fact, with fixed production costs dampened by low fossil diesel prices, the higher-value producers will insist upon low seed feedstock prices in order to maintain a profit margin. The ensuing necessities of economies of scale for the plantation of *Jatropha curcas*, as well as for the industrial processes of oil expelling and transesterification, will create incentives for larger holders. Recent evidence has shown that competing with fluctuating imported fossil diesel prices has already proven to be difficult for biodiesel sales in India, causing some producers to stop production in order to suspend losses due to uncompetitive costs of operation in the short term (Srinivas 2007). Although entrepreneurs may be able to cover their loses, limited-resource farmers cannot as easily forgo their income nor be expected to invest in risky plantations that will take multiple years to recover any capital expenditures.

If there is not a specific policy to promote smallholders and smaller, decentralized production facilities, these smaller producers may find their access to this sector limited. Even if all of the jobs that the government envisions were created, the majority of them would likely be low-paying, seasonal jobs that could hardly be expected to raise the standard of living in rural areas. Aside from harvest and seed-processing periods, most of the labor would occur in the first year of establishment and then diminish to fewer jobs in maintenance and weeding. Most of the profits for biodiesel production would be claimed by entrepreneurial businesses and individuals that can meet the large-scale needs of production as well as by higher-skilled staff working in centralized processing plants. It is more difficult to predict the effects on the smaller producers under whose name the programs are being promoted.

Whose land? Whose wealth? The quality and ownership of the lands intended for plantation must also be discussed. The effort to promote cultivation of *Jatropha curcas* is often described as having a dual purpose of creating energy plantations and addressing the degradation of low-productivity wastelands. India has 63.85 million hectares (20.7 percent of the entire country) that are referred to as "wastelands" (Government of India 2000). But what exactly determines a "wasteland" classification? Shiva (1991) points out that the idea of "wasteland" is a colonial construction and a revenue classification, not necessarily an ecological classification. Areas that did not create revenue for the state did not interest the state bureaucracy and were therefore considered "wastelands." These lands were not considered a waste, however, for the local people, who relied on them for firewood, fodder, grazing land, and other foraged, nonintensive products. Shiva's argument points out

[7] Biodiesel taxes would not be forgone if Indian Railways were the chief consumer, since it is owned by the Indian government.

that the state and private enterprise hold differing views of what is considered "productive" land. The government's classification of wastelands has several ambiguous categories (see Table 1). Government plans call for plantations on forest, nonforest, and "other" land (Government of India 2002, 120–121), and they set quantifiable limits, in terms of nitrogen and phosphorus, on the soil quality of land they will subsidize for biodiesel feedstock production. There are reasonable concerns, however, that if prices for biodiesel rise to a certain level, cultivation of nonfood crops such as *J. curcas* or other biodiesel feedstocks will extend to other arable lands or threaten some forms of biodiversity.

Beyond the question of land quality and productivity, issues of ownership and entitlement must also be addressed. Many of the lands described by the plan are held by the state and managed by collaborative groups of government and user group representatives, as with Joint Forest Management Committees, or are owned collectively by communities, such as *panchayats*. Many of the proposed nonforest areas are also on privately held land. Both types of ownership present obstacles not only for efficient production of oil feedstock, but also for egalitarian means of production whereby the livelihoods and food security of the disempowered are also considered.

In the past collective ownership situations have proven very difficult to manage for large-scale commercial production without less-empowered parties being overrun by industrial or government interests, even disregarding the inevitable issue of corruption. A "tragedy of the commons"–type situation is almost unavoidable when outside interests stand to gain financially from the exploitation of common lands (Shiva 1991).

A brief look at the history of such efforts reveals a very similar and prescient experience with the promotion of eucalyptus plantation by social forestry programs. Although the debate has cooled in the past few years, the subject of the ecological and social degradation brought on by massive government social forestry programs to bring "wastelands" into production through large-scale monocultures of eucalyptus for industrial use is still a sensitive topic. For smallholder farmers on marginal lands, landless laborers, and certain *panchayat* groups that were victimized by colluding commercial and government interests, the species itself became demonized. The eucalyptus social forestry system, justified by familiar claims that it would reduce poverty, improve degraded lands, and meet the needs of a booming economy, left participating *panchayat* members and small farmers without sources of fuelwood and fodder.

Table 1: Wasteland Classifications and Areas

Category	Total wastelands (ha)	% of total area
Gullied and/or ravinous land	2,055,335	0.65
Land with or without scrub	19,401,429	6.13
Waterlogged and marshy land	1,656,845	0.52
Land affected by salinity/alkalinity—coastal/inland	2,047,738	0.65
Shifting cultivation area	3,514,220	1.11
Underutilized/degraded notified forest land	14,065,231	4.44
Degraded pastures/grazing land	2,597,891	0.82
Degraded land under plantation crop	582,809	0.18
Sands—inland/coastal	5,002,165	1.58
Mining/industrial wastelands	125,213	0.04
Barren rocky/stony waste/sheet rock area	6,458,477	2.04
Steep sloping area	765,629	0.24
Snow-covered and/or glacial area	5,578,849	1.76
Total wasteland area	63,851,831	20.17

Source: Government of India 2000.

Furthermore, it displaced landless laborers from traditional labor as agricultural workers and sharecroppers on these lands so that absentee landowners could guarantee production for pulp and rayon factories. Meanwhile, the eucalyptus plantations further degraded the soil and lowered the water table because of inappropriate management schemes (Raintree 1996; Shiva 1991; Hiremath and Dandavatimath 1996).

Production on private lands lends itself to similar problems. India has maximum landholding laws for individuals to help reduce landlessness and to prevent hoarding by wealthy individuals or corporations. The scale of production of *Jatropha curcas* oil on disparate smaller holdings will certainly be lower than on larger-scale monocultures, which raises concerns about how these small holdings can meet the base demand for feedstock to continuously operate a scaled-up expelling and transesterfication facility. A different and more complex infrastructure and system of incentives will be necessary to encourage smaller holders to invest in *Jatropha curcas*, even at the level of border cropping or live fencing—approaches that would help maintain biodiversity and reduce the potential for displacement of food production.

Stakeholders

There are potentially four main stakeholder groups to consider: (1) government agencies that can promote the development of various biodiesel production programs; (2) private investors whose capital will be needed for production schemes and who also stand to gain considerably from the sale of biodiesel; (3) the consumers of the final biodiesel product; and (4) the producers of the oil feedstock. This final category may include either small or large holders of land and must also include the labor necessary to plant, maintain, and harvest seed crops, as well as the labor involved in processing and distributing the final product.

Policy Options

The current government plan, in which public-private partnerships will fuel the development of plantation schemes, production infrastructure, and distribution, is the best mix of market incentives and public direction for the development of poorer rural regions and the agricultural sector. At the same time, this public-private approach can proactively protect the environment and national security interests. The two-phase plan, as already described, has sufficient incentives to encourage broad investment by private entrepreneurs on all levels and will still protect and benefit the rural poor by infusing them with large amounts of financial capital, boosting employment and creating numerous small-scale investment opportunities. Investment by risk-averse marginal farmers in unproven technologies will need proper promotion through various means, such as subsidized loans, tax incentives, and effective extension strategies. This project leaves ample room, however, for profit motives and other market forces to take effect, and there will no doubt be a long-term demand for oil-producing plants around which to build a reliable market. The ecological and social concerns described will be worked out iteratively through research during the process, but the present demand for cleaner energy makes the program worthwhile.

The government should further consider some of the issues described and redesign its promotion strategies to ensure a more sustainable and just intervention. The livelihoods of the rural poor are vulnerable and contingent on a variety of institutional arrangements within public, private, and civil society sectors. Development interventions on their behalf must be durably and dynamically pro-poor in design and adaptable to the changing needs of the population. Programs and technologies that allow rural producers to be the primary beneficiaries of the oil are given minor roles in the government report on biodiesel (Government of India 2003), but they should be more actively promoted. Examples of such technologies that could be widely dispersed are smaller-scale collection, expelling, and transesterification technologies, direct-use oil cookstoves, milling machines, irrigation pumps, and even diesel generators for lighting and other uses. If the producers are the direct beneficiaries of the product, aversion to widespread adoption is more likely to disappear.

Programs like the AMUL dairy cooperatives, where many individual producers bring milk to a central collection point and collectively take advantage of value-adding high-tech equipment and therefore higher prices, have ushered in major changes for marginalized dairy producers as well as the general public (see Esman et al. 1997). Although the dairy and biodiesel programs are vastly different and deal with different constraints, the model in which many

small producers take advantage of collective management to gain access to technologies required for economies of scale could be replicated for oilseeds. Integrated agroforestry techniques such as alley cropping, contour bund planting, live fences, and border plantations should be promoted over monoculture plantations. A more diverse regime of oilseed-bearing tree species such as *Pongamia pinnata* and jojoba, which may have more direct uses, like fodder production, nitrogen fixation, lumber, and fuelwood, should be more actively promoted over monoculture *J. curcas*. These diverse, stable systems could better meet the dynamic needs of rural producers and protect biodiversity.

All of these changes would require, however, greater public intervention in research and extension and in creating proper incentives for small producers (at the cost of lost efficiency, productivity, and profitability, and therefore the potential interest and capital investments of the private sector). If productivity declined and the end-user focus shifted away from wealthier urban fuel consumers toward lower-capital-producing, poorer rural people, commercial interest in promoting infrastructure could also decline. Possibilities for larger-scale environmental benefits from biodiesel use, like a reduction of greenhouse gases, may also be reduced if usage remains mostly in the rural areas. The increased complexity of diverse sources of production and end product usage could cause the project to lose focus, threatening all beneficial outcomes. The AMUL dairy cooperatives took nearly 20 years to gain significance in one small area before being mobilized as Operation Flood (Esman et al. 1997). Can the environment or the economy wait that long for greener energy?

The government should avoid involvement in promoting dubious new technologies that will cause uncertain socioeconomic impacts. In the early 1990s attempts by the government to promote *Jatropha curcas* for the purpose of oilseeds found little interest among poorer populations dependent on their land for their livelihoods and lost momentum in the private sector owing to a lack of production and profits. The market alone should direct the development of biodiesel technology. When global oil prices are sufficient to create a demand for alternatives, the supply will be met on the basis of profit motives.

Assignment

Your assignment is to recommend to the government a policy to guide the ongoing development of biodiesel in India that takes into account the interests of the various stakeholder groups.

Additional Reading

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Chapter Nineteen
Civil Society Strategy to Fight Soil Degradation in Peru (8-1)
by Lesli Hoey

This case study could not have been written without the contribution of Heifer Project International (HPI) Bajo Piura soil improvement project members who participated in a rapid appraisal of project impacts co-led by the author, along with Luis Gómez Abramonte and José Namoc Rodriguez, lead HPI Peruvian staff members, who implemented the Bajo Piura project.

Executive Summary

Soil degradation, a process that reduces the potential of land to support animal and plant production, has become one of the most pressing problems for farmers worldwide (Scherr 1999). Based on the opinions of 250 international experts, the United Nations Global Land Assessment of Degradation concluded as early as 1992 that degradation had caused a 38 percent loss in global agricultural land since the 1940s (Oldeman et al. 1992). This soil loss, at a rate of 5 to 10 million hectares per year, has multiple causes, including nutrient and vegetative depletion, agrochemical pollution, deforestation, and soil erosion due to severe floods, wind, and steep hillside farming (Scherr and Yadav 1996).

Despite dire forecasts, Dregne and Chou (1992) estimated that reduced soil quality would not threaten the balance of international food supply in the near decades. What warrants close scrutiny, however, is the regional impact of these changes, particularly in hot spots where degradation may be reversible only through costly on-farm investments or engineering strategies, if at all (Scherr and Yadav 1996). Drylands alone are 70 percent degraded, affecting nearly 2 billion people (FAO 2002). Regionally, Latin America has the highest proportion of degraded agricultural land in the world, followed by Africa (Scherr and Yadav 1996).

Peru's north coast, the focus of this case study, is threatened most by salinization, a process that can cause irreversible desert-like conditions (UNEP 1992). With salinization now affecting up to 40 percent of cropland on the north coast (Collado 2001), the situation could have national repercussions. Although the coastal valleys make up only 3.8 percent of Peruvian agricultural land, including pasture and forest, they yield 50 percent of Peru's gross agricultural product (Vera 2006). Despite a history of intensive agriculture on the north coast that extends back to 200 C.E. (Nordt et al. 2004), it appears that recent changes—irrigation practices, rice-focused production, and limited opportunities to invest in or build the capacity for soil conservation—have exacerbated the susceptibility of soil in the region to salinization.

The Food and Agriculture Organization of the United Nations (FAO), World Bank, and United Nations all agree that soil conditions may improve most through community initiatives that increase productivity sustainably while improving the economies of poor households dependent on agriculture (Dixon et al. 2001; UNCCD 2005). One program implemented in the Peruvian coastal department of Piura by the nongovernmental organization (NGO) Heifer Project International (HPI) appears to have had success. HPI's key strategies focused on participatory planning and management with leaders of local irrigation commissions, training in eco-agriculture practices, and rotating funds for small-scale livestock and seeds for alternative crops. After three years, the project expanded from 20 households to 689, and farmers reported reduced salinization, lower input costs, and increased production and income. Despite HPI's apparent success, some development theorists question whether local impacts like this can last or how valuable they are to broader systems without scaling up.

Considering the wider policy environment presented here, your assignment is to determine the next steps you would take if you were directing HPI in Peru. Who would you target, how, and why? Should HPI continue working exclusively with

farmers, or should your organization try to partner with or influence other civil society actors, policy makers, agrochemical companies, or credit agencies? Ultimately, where is your comparative advantage as an institution, and what are the risks of attempting to target certain actions and ignoring others?

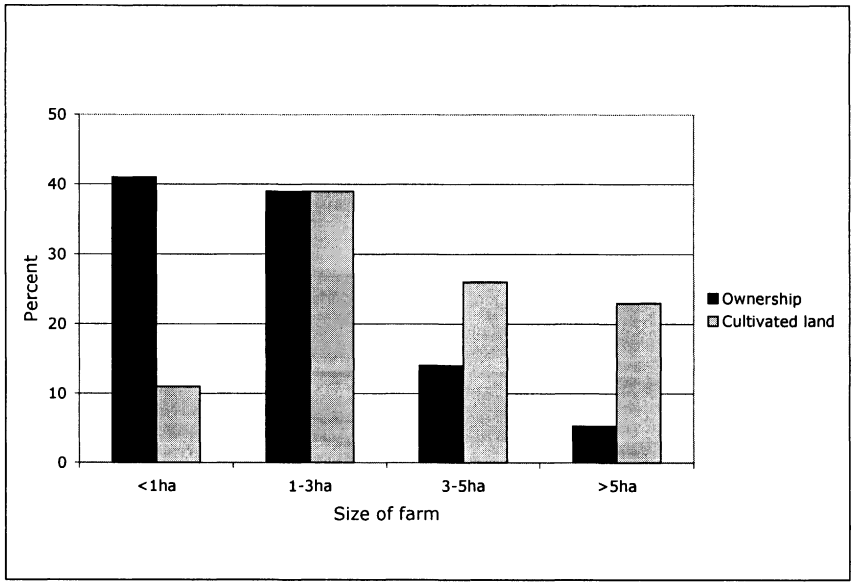
Background

Primary agricultural production amounts to 8.5 percent of Peru's gross domestic product (CIA 2007), but more than 37 percent of the population is employed in the agricultural sector (ECLAC 2005). The most recent agricultural census in 1994 showed that more than 60 percent of the country's 1.8 million farms were smaller than five hectares and of poor quality (INEI 1994). Antolin Huáscar, president of the National Agrarian Confederation, and Hernando De Soto, president of the Institute for Liberty and Democracy, claim that of the 8 million farmers and rural laborers in Peru, concentrated along the north coast, only 1 million own their land and have access to financing (Salazar 2006; Fernandez-Morera 1999; Figure 1). As the following policy analysis illustrates, it is these small-scale farmers who are most affected and least able to reverse rapid salinization. Salinization rose from affecting 20 percent of Piura cropland in 1963 to 40 percent in 2000 (Figure 2). Although ownership rights are unclear, 95 percent of Piura farms are less than five hectares.

Policy Analysis

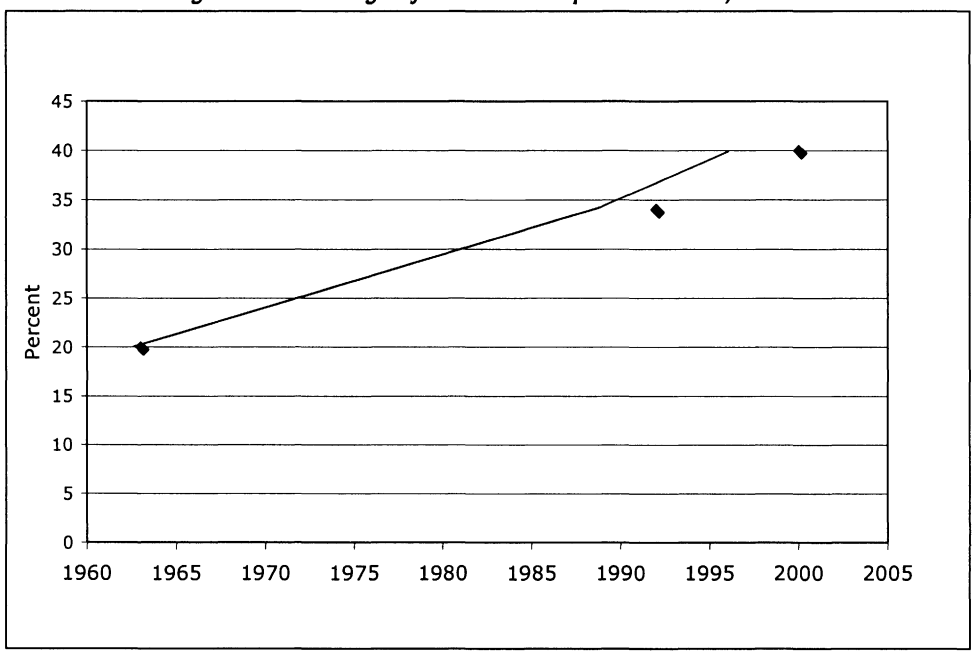
Among the factors that appear linked to increasing rates of salinization in Piura are modern irrigation infrastructure and management systems, a focus on water-intensive rice production in the past 30 years, and several factors—costly agrochemical inputs, limited access to credit, and a poorly coordinated institutional environment—that have reduced the capacity of small-scale farmers to invest in soil conservation practices.

Figure 1: Farm Size and Percentage of Cultivated Land in Piura, 1997



Source: Padrones de usuarios de las Comisiones de Regantes 1997, cited in Boucher 2002, 23

Figure 2: Percentage of Salinized Cropland in Piura, 1963–2000



Source: Dregne and Chou 1992; Collado 2001

Necessary but Problematic Irrigation Systems

The extreme desert conditions along Peru's north coast have required effective irrigation and drainage systems for controlling water variability and overcoming the tendency of soils to salinize for centuries (Nordt et al. 2004). Yearly rainfall in this region averages 23.2 millimeters, and sometimes as little as 12 millimeters over a period of several years (Nordt et al. 2004; Siversten and Lundberg 1996). Combined with high temperatures, the sandy, mineral soil experiences high evapotranspiration rates that draw moisture up from the water table and deposit salts on the surface. If managed effectively, irrigation can promote effective leaching of minerals. Poor drainage systems, however, allow clay particles to accumulate, eventually leading to waterlogging and the buildup of toxic chemicals and salts.

In their case study of irrigation systems along the north coast, Siversten and Lundberg (1996)[1] found that pre-Inca, earthen canals are still used in some areas to channel runoff from the Andes, but this traditional system changed during the 1950s when the central government began promoting commercialized, intensive agriculture. Modern irrigation systems with reservoirs and new concrete canals improved the speed, amount, and timing of water many coastal farmers received, but over time it also increased the tendency of soils to salinize (Figure 2). Whereas previous irrigation systems relied on the flow of rivers and runoff and thereby distributed nutrients and minerals to fields as a way of maintaining soil fertility, now nutrients and minerals become trapped in the basins of dams. The concrete canals prevent seepage, which was critical for keeping the water table low and the process of salt accumulation slow. Finally, many of these new systems are poorly constructed and require regular maintenance of drainage systems, critical for preventing waterlogging.

Siversten and Lundberg (1996) also concluded that the irrigation system they studied in the bordering department of Lambayeque did not benefit all farmers equally. Access to effective maintenance

[1] Some caution is required regarding the conclusions Siversten and Lundberg (1996) draw, because they provide little description of their methodology. They draw on an extensive literature review, use national statistical databases, and describe comparisons of "distinct" villages and case studies of three farmers, not selected randomly, who represented three sizes of farms (1, 7, and 60 hectares).

and to sufficient and predictable amounts of water was often dependent on political influence or higher payments. Each sub-department in the north coast has a local irrigation commission, or Comisión de Regantes, responsible for coordinating upkeep and deciding the timing, amount, and cost of water distribution. Sub-departments in Lambayeque with more political influence, and often larger landowners, were able to secure state investment for new concrete canals and drainage systems. This investment in the mid-1980s allowed some municipalities in the region to reduce salinization problems over nine years and to transport larger amounts of water, increasing their production of rice. Neighboring municipalities with older irrigation canals, smaller landholdings, and poor drainage systems, on the other hand, experienced gradually worsening soil conditions. Additionally, when water is scarce from June to December, some farmers, particularly large landowners, obtain more than their share by buying at higher prices or illegally siphoning upstream. Farmers with capital can also install pumps or windmills to draw groundwater or build small reservoirs to collect rainfall or water released through the irrigation system.

An Emphasis on Rice Production

In Piura, irrigation systems may be less to blame for current soil problems than the amount of water-intensive rice produced. During the 1990s, Piura farmers began planting more rice than any other crop, and by 2004 the department was the second-largest producer in Peru (Boucher 2002). High national rice prices during the 1990s motivated much of this production, as did the Ministry of Agriculture's subsidies for rice cultivation in the north coast (Vinatea 2005). Between 1994 and 2004, after indigenous chicken meat, paddy rice competed with potato production as the most important agricultural commodity produced in Peru (ranked by value) (FAO 2004). Rice also outpaced most crops in the total land area dedicated to its cultivation. In 1990 cotton, corn, and rice were planted in nearly equal amounts (between 140,000 and 190,000 hectares), but by 2003 cotton had fallen to less than 70,000 hectares and corn and rice had increased to 260,000 and 320,000 hectares, respectively (Notte 2004).

For some small-scale farmers, however, rice production appears to be leading them into a difficult trap. The situation is described in a case study in Siversten and Lundberg (1996) and in an HPI-Peru report based on five years of work with more than 600 Piura farmers whose farms averaged 1.7 hectares (Abramonte and Rodriguez 2005b). National policies and a lack of markets for crops other than rice make it difficult for farmers to diversify along the north coast. Sometimes their choice is made when water from neighboring farms inundates their fields. Yet if they cannot control when this water arrives or invest in or maintain effective drainage systems, fields can become waterlogged and salinized. Rice production also requires large amounts of water to cover rice seedlings, increasing costs; the volume of water required is even greater if a farmer cannot afford to have his or her field leveled to ensure that all areas are adequately covered. Even if rice production can be sustained at first, the effects of frequent droughts and fluctuating international prices (Mori 2006) gradually reduce the profit margin. As one HPI project farmer says, it may not make sense for small-scale Piura farmers to maintain a dependence on rice production:

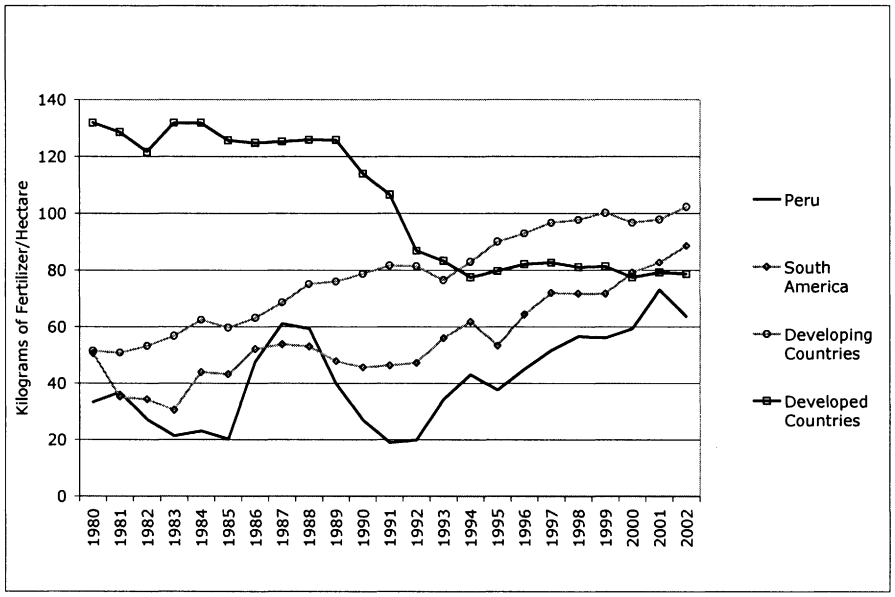
> Here, we (HPI project members in Piura) have to work hard with trainings to develop a culture that doesn't plant rice on the coast because the cost of water is high. We cannot continue insisting or count on an infrastructure that is so costly with large dams, canals, and drains to continue cultivating rice, a crop that in the long-term is not profitable for producers. The training must begin in school, to create an awareness that we must begin planting alternative crops (Abramonte and Rodriguez 2005b, 41).

An Agrochemical Culture

As the profits from key crops like rice fall for small-scale farmers, another common practice that keeps production costs high in Piura—agrochemical use—is further diminishing poor farmers' ability acquire the necessary capital at the start of each season to make long-term investments in their farms. Along with irrigation, farmers in Piura have always needed high levels of nitrogen inputs. Nordt et al. (2004), for instance, found that pre-Inca cotton farmers along the coast left leguminous *algarrobo* trees standing among fields for leaf litter fertilizer as well as adding inputs of seabird guano, llama dung, and fish heads.

Although there are few data about agrochemical use specific to Piura, Figure 3 illustrates how chemical use across Peru has steadily increased since 1980, as it has in South America and developing countries generally. With agriculture

Figure 3: Mineral Fertilizer Use Intensity, 1980–2002



Source: FAO 2006

concentrated along Peru's north coast, it is safe to assume that this increase is disproportionately concentrated in departments like Piura. HPI staff report that, before the farmers they worked with adopted eco-agriculture approaches, agrochemicals constituted 30 to 40 percent of their production costs. Few were using low-cost methods to build soil nutrients, such as nitrogen-fixing trees, manure, compost, or crop residue (Abramonte and Rodriguez 2005b). In a 2005 rapid appraisal of HPI's impacts[2] co-led by the author and 2 HPI field staff, nearly all 30 farmers and 5 irrigation commission leaders interviewed discussed the marketing and cultural pressure they felt to use chemical fertilizers and pesticides. A "mentality" that agrochemicals were necessary for productive farming had developed. As one farmer described, "(Neighbors) used to say I was a *cochino* [filthy person] because I put down manure" (Medio Bajo Piura Heifer Project Farmer 2005). Faced with salinization or other soil degradation, small-scale farmers may feel forced to increase fertilizer inputs. Disregarding the possibility that farmers may be increasing the alkalinity of the soil through excessive fertilizer use, such high inputs further undercut short-term profits and their ability to make investments for long-term soil improvement.

Conservation-Discouraging Credit Policies

Access to loans could help farmers make the investments necessary to improve their soils, increase their production, and reduce their risk over the long term. The Inter-American Development Bank (IADB) describes how credit policies in the Andes instead discriminate against resource-poor farmers and in so doing, discourage long-term soil management (IADB 2001). Because of the obstacles they confront, small-scale farmers often choose not to take out loans or feel they have no access to credit agencies; a survey of 500 farmers in Piura by the University of California at Davis found that 42 percent of them had no loans in 2003[3] (Figure 4; Guirkinger 2005). For those who do have loans with high interest rates, repaying them, rather than making productive

[2] Fieldwork for two days took place in six of the seven project communities. It involved interviews with 24 individuals from 10 project households and one focus group with 11 project members (including 5 irrigation commission leaders, who were the local HPI project leaders). The focus group was open to all project members, while households were selected by HPI staff to represent the communities involved and those they felt were most and least successful project members.

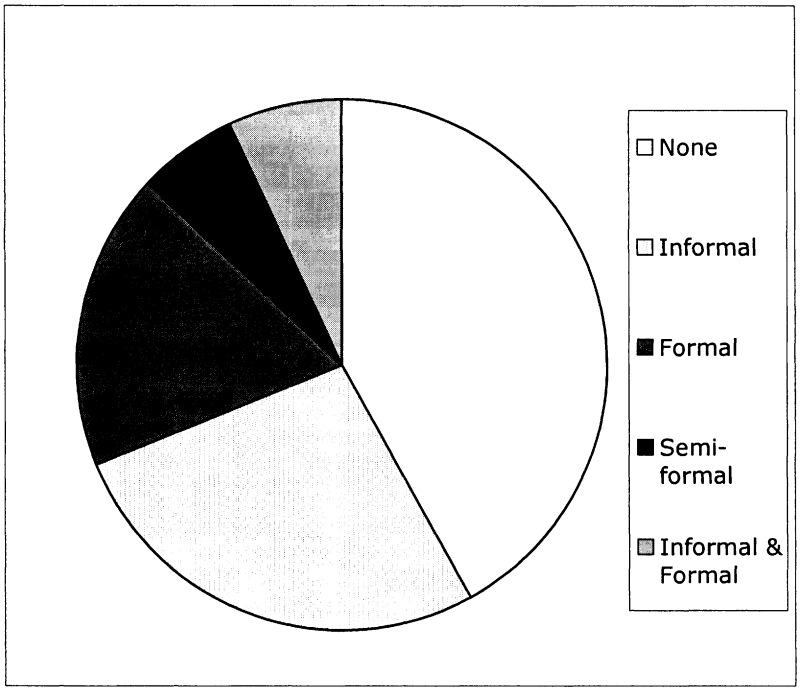
[3] Six percent of farmers had "semi-formal" loans offered by NGOs and targeted government programs. These are described more in the "Policy Options" section.

investments, often becomes a short-term priority. Arslan (2003) predicts that both of these situations can cause a spiral effect, where the natural resource base can deteriorate more rapidly, ultimately making it difficult for farmers to make investments and increasing their susceptibility to shock.

When farmers do seek out loans, smallholders often cannot get access to formal credit with low interest rates because they lack the necessary collateral (Boucher 2002). The UC Davis survey, for instance, found that only 18 percent of Piura farmers in 2003 had formal loans, and many who did were large landowners (Guirkinger 2005). As Arsalan (2003) describes, the assets poor farmers do have are typically informal and cannot be used for collateral, whereas those who do have enough collateral may fear losing their primary productive asset. Even if farmers can obtain formal loans, if they default, they face higher interest rates and are denied additional formal loans until their debt is paid (Guirkinger 2005). In this situation they are often forced to acquire a loan from the informal sector to help pay off their original formal loan. The IADB (2001) also describes how financial crises reduce what few resources poor farmers might have, further lowering their ability to turn to the formal financial sector for help. Unfortunately, this scenario has been true for many vulnerable farmers as crop prices have fallen owing to macroeconomic factors across Latin America and Peru, forcing them to acquire whatever loans they can to pay off existing debts (Guirkinger 2005).

Whether farmers take out informal loans out of choice or necessity, local lenders are often more accessible and pose fewer risks for small-scale farmers in the short term. In the 2003 study, 27 percent of Piura farmers had only informal loans and 7 percent a combination of formal and informal loans (Guirkinger 2005). Informal lenders offer a form of insurance not provided by the formal sector: additional financing even as a farmer is trying to repay a previous debt. Informal loans are also virtually collateral-free, and going to your local moneylender has fewer transaction costs (the time to secure a loan, travel costs, and procedural costs).

Figure 4: Types of Loans Held by Farmers in Piura, Peru, 2003



Source: Guirkinger 2005

These lenders do, however, charge interest rates up to twice as high as those of formal lenders (Boucher 2002). Local farmers also described another drawback: in return for an informal loan, farmers are sometimes forced to sell their harvest to the moneylender at a cost below the market value (Abramonte and Rodriguez 2005b).

A Changing Institutional Climate

Changing any of the previous policies depends largely on the type of institutional support and coordination that surrounds farmers. During the 1990s the Peruvian government instituted two major plans that had the potential to help farmers in departments like Piura improve their livelihoods: it decentralized the Ministry of Agriculture, and it undertook a national action plan to fight desertification. The result has instead appeared to create more disarray and what Llambi and Lindemann (2001, 3) describe as a "notorious vacuum in the institutional apparatus of the country."

The process of decentralization began affecting Peruvian agriculture in 1992 with the Organic Law of the Ministry of Agriculture. This law parceled out the Ministry of Agriculture's support services and regulatory functions to local municipal governments. Although rural municipalities in Peru are often more involved in local agriculture and can be held accountable more easily by local communities, the administrative process of decentralization was not accompanied by sufficient capacity building or funds to optimize the effects it might have had. In their assessment of Peru's decentralization process, Llambi and Lindemann (2001) point out that municipal governments often do not know the national laws, lack administrative capacity to raise funds and design or monitor investment projects, and do not have the knowledge to negotiate with other public agencies or private firms. Most important, local governments often have little information about the larger political and economic environment to help them develop long-term development strategies. According to Lindemann and Llambi (2001, 3), this has resulted in "management through projects" with no coherent long-term plans. As they describe it, a "project approach to sectoral policy creates . . . an overabundance of ad hoc institutions with a short life span. Moreover, these generally locally-based or subsectorally-oriented projects are not designed to address the structural causes of rural poverty."

Just as municipalities were facing this new institutional setting, in 1996 Peru joined the United Nations Convention to Combat Desertification (UNCCD) with its ambitious national action plan to fight desertification (referred to as PAN-Peru). Piura first appeared to be one of the most organized departments with its "Piura 2010" plan (Guevara 1999). This plan was intended to heighten communication and collaboration around issues of natural resource management across public agencies, universities, unions, NGOs, and businesses. Local institutions, including the National University of Piura, the Peruvian Center for Social Studies (CEPES), the Agrarian University of Molina, and the Center for the Study and Promotion of Rural Information (CIPCA), were to monitor environmental issues in the area. The media was also involved, with *The Green Crusade* newsletter launched by the newspaper *El Tiempo* and the "Cutivalu" radio show that discussed environmental and agriculture issues facing the area.

Despite this earlier coordination and other Piura-based initiatives sparked by NGOs, municipalities, and communities, these efforts were not part of integrated regional or national policy (Guevara 1999). PAN-Peru did not in fact become the "central reference" to guide these institutions and projects (Valderrama 2001), and the regional association that formed to develop Piura 2010 no longer functioned by 2002 (INRENA 2002). As Guevara observed in 1999, the coordinating bodies that did exist in Piura were relatively isolated and restricted to the academic community or other limited circles and not utilized in a coordinated way by the business sector, communities, or municipal government. The committees or commissions that did involve these multiple stakeholders were typically short-lived and established to take action on immediate, not long-term, structural problems.

Policy Options

For a country like Peru, where less than 3 percent of the total land area is arable (ECLAC 2005), slowing or reversing the current rate of land degradation within its most valuable agricultural region is critical for protecting the nation's future economic growth and food supply. For the vast majority of poor farmers along the coast who rely on agriculture as their principal livelihood, it is a question of how quickly, affordably, and sustainably their soil quality can be improved. A number of policy options exist to address the multiple factors discussed, but it is unclear which of these

issues is the most critical, who should address them, and by what means.

The Heifer Project International Approach

The FAO, World Bank, and United Nations all agree that combating soil degradation may work best through community-based initiatives (Dixon et al. 2001; UNCCD 2005). HPI's Piura soil improvement program, mentioned previously, appears to bear out this idea: it has led to sustainable increases in yields and improvements in the socioeconomic conditions of households dependent on crop production.[4]

Working out of the lower Piura region, referred to as Bajo Piura, the HPI-Peru office started in 2001 with 20 smallholders considered *locos,* the crazy men in their communities. These were smallholders willing to take a risk, innovate, and become showpieces capable of convincing neighbors that their efforts would be successful. Through participatory planning sessions, HPI considered with farmers what factors would motivate them to make long-term changes to their system of production in ways that would minimize risks to their yields or income levels in the short term. Using ecological agriculture practices, the long-term goal was to recoup highly salinized land, reduce input costs, increase profits, and improve food security.

Over a period of three years, the first phase focused on improving soil fertility by replacing costly agrochemical inputs with substitutes like manure, vermiculture, crop residue, mulch, and bird guano. The second phase focused on diversifying farm production without competing with other crops. This phase included planting locally adapted fruit trees (mango, lime, and tamarind) or nitrogen-fixing leguminous plants along paths, borders, or other open field space. Many households also received a small starter herd of sheep, to which they fed readily available crop residues and from which they received manure for fertilizer, meat to supplement family nutrition, and a "living bank"—an asset they can sell in case of emergencies.

The goal for the final stage was sustainable agroecological production. To ensure these efforts would last in the long term, HPI staff worked to build the capacity of local irrigation commissions to carry on similar agroecology initiatives by involving leaders in the design, implementation, monitoring, and evaluation of the project in their communities. The local commissions chose 25 community members to become trained as agroecology promoters to offer training and support to project members. Five community members were also trained as informal veterinarians to provide (at a substantially reduced cost) vaccination campaigns and basic veterinary skills to livestock owners (both project members and nonmembers). In HPI's tradition, families each contributed to a "Passing on the Gift" rotating fund to provide additional families with sheep, vegetable seeds and fruit trees, basic equipment (such as plastic barrels for making organic fertilizer), and funds to replenish veterinary kits. Workshops and farmer-to-farmer exchanges focused on homemade insecticides, compost fertilizer, other agroecology practices, leadership building, and gender-focused personal and family empowerment.

By 2004 the HPI-Peru office reported expanding from 20 participants and 3 irrigation commissions to 689 households and 7 irrigation commissions (Abramonte and Rodriguez 2005b). More than 300 households had expanded into livestock production (primarily for self-consumption), and all were incorporating some aspect of agroecology (such as using manure compost, tilling crop residue into the soil rather than burning it, or using homemade organic insecticides) or diversifying their production. Irrigation commissions were expanding their work plans beyond issues of water management to hold additional training in agroecology and leadership. Project members also spoke of efforts to push the larger Piura irrigation board to coordinate with state institutions to support policies favoring agroecology development in rural zones.

Although no systematic quantitative data were gathered, during the rapid appraisal conducted in 2005, all 35 project members interviewed discussed the input costs they saved using fewer agrochemicals; the salinized land area they had recovered; the increased production they had experienced (often double the amount, which the evaluation team observed by comparing fields that were salinized, recovered, or nonproject); and the higher income they had gained from these practices. The majority also talked of a critical change they and their neighbors had experienced in their mentality, or approach to farming. By the end

[4] Descriptions of this HPI project come from the Heifer-Peru 2005 report (Abramonte and Rodriguez 2005b) and the 2005 rapid appraisal co-led by the author, described in footnote 2.

of the project, all saw manure and mulch as valuable forms of fertilizer and had replaced at least a portion of their previous agrochemical use with these substances and other low-cost, homemade insecticides and fertilizers. They all had fewer fields devoted to monocrops of rice, cotton, or corn. They were eager to plant more locally adapted fruits and vegetables and were more aware of the importance and means of building soil quality through eco-agriculture methods.

Additional Policy Options

Despite HPI's apparent success, some development theorists question how long local impacts like this will last and how valuable they are to broader systems if they do not scale up. A project involving 689 households may be large by NGO standards, but its reach is small in a department that encompasses a rural population of more than 1 million (Brinkhoff 2007). HPI may be yet another ad hoc institution that cannot have an impact on the structural causes of poverty and broad-based natural resource problems. Llambi and Lindemann (2001), for instance, suggest that locally based projects like HPI's need to collaborate with national economic strategies and sectoral policies. Although it appears that there are many research institutions, state agencies, private sector agencies, international organizations, and local NGOs involved with similar natural resource management efforts in Piura, HPI only discusses their involvement with the local irrigation commissions and never deals with them directly.

HPI-Peru staff, for instance, fail to discuss how affordable, less discriminatory credit might benefit the poor farmers. Boucher (2002, 1) describes how liberalization and free markets create a context where "the ability of institutions to overcome the obstacles to providing affordable credit to small farmers will play a key role in determining which farmers will be able to participate and which will be forced to exit the sector through land rental or sale." Some government programs and NGOs in Piura already offer "semi-formal" subsidized credit with low interest rates and flexible collateral requirements, but currently they make up a small percentage of the value of all loans in the area, and access is restricted to targeted government programs or communities where these few NGOs work (Guirkinger 2005).

HPI also appears to have overlooked (or may not have the capacity to influence) the markets these small-scale farmers can access. Several farmers interviewed during the rapid appraisal hoped to find markets for their organic fruits and vegetables, but reported having few prospects for reaching regional or national markets. At least two hoping to export internationally described the practical need for a critical mass of neighboring farmers to also make the shift to these alternative crops (Scriven et al. 2005).

Like many NGOs, HPI has not yet considered engaging the private sector. In a similar situation in Rangpur, Bangladesh, excessive and inappropriate use of fertilizers was increasing the alkalinity of the soil, reducing soil productivity, and increasing farmers' expenses. Katalyst, a project implemented by Swisscontact and GTZ International Services and supported by the U.K. Department for International Development (DFID), other major donors, and the Ministry of Commerce, supported the creation of a private business focused on soil testing for vegetable production. Preliminary results appeared to show that farmers who paid for this service had reduced use of chemical fertilizers, greater use of organic composting, and improved soil health (Katalyst-Bangladesh 2004).

This case study raises the critical question of what role the central government should play in projects like HPI's. The government already appears to be taking on a share of what HPI was trying to do. Reacting both to problems of salinization and to lower rice prices, in February 2006 the Peruvian Ministry of Agriculture announced a "Plan to Convert Rice Cultivations" on up to 10,000 hectares (Mori 2006). Farmers are being promised financial and technical assistance in deciding which crops would be most appropriate and most lucrative on the international market, including artichokes, paprika, peppers, citrus, or mangos. Although the ministry's plan to help farmers diversify has potential, it does not discuss the pacing of implementation, which farmers will be targeted, and how they intend to ensure farmer livelihoods during the transition. It also fails to consider parallel strategies for improving soil quality or for addressing the strong culture of agrochemical use, an input cost that may continue to rise even as farmers invest in higher-value crops.

Assignment

What steps should Heifer Project International take next to ensure that small-scale farmers in Piura

improve their livelihoods and maintain soil improvements? Like many NGOs, the Heifer-Peru office has little empirical evidence upon which to base its decision at the completion of this project. Staff have farmer testimonials, informal reports, one external rapid appraisal, and personal experience. Yet time is of the essence as the region as a whole continues to experience rapid soil degradation. Market trends, national policies, or agromarketing could potentially reverse the apparent gains HPI farmers have made. Based on the HPI impact reports and the wider policy environment presented here, consider what direction you would take if you were directing the HPI-Peru office.

Who would you target, how, and why? Should HPI continue working exclusively with farmers, or should your organization try to partner with or influence other civil society actors, policy makers, agrochemical companies, or credit agencies? Could your staff, for instance, have a larger impact if you influenced the government to adopt more holistic strategies and provide more equitable support for irrigation and drainage infrastructure? Should part of this effort include building the capacity of marginalized irrigation commissions and farmers groups to advocate to local or national government for their needs? Would it be possible, and how would farmers fare, if you attempted to influence policies for alternative markets, state extension policies, or credit practices? Ultimately, where is your comparative advantage as an institution, and what are the risks of attempting to target certain actions or of ignoring others?

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Chapter Twenty
Incentives for Soil Conservation in Peru (8-2)
by Helena Posthumus

Executive Summary

Soil erosion poses a serious threat to agricultural production in developing countries, especially in regions such as the Andes, where soil erosion is widespread and affects the livelihoods of farm households. Despite considerable program efforts to promote soil conservation practices among farm households, the uptake is often disappointing. Often these practices are not cost-efficient for the farm households. To counteract the lack of benefits, natural resource management programs intervene by providing households with direct incentives to promote soil conservation practices. The use of direct incentives is criticized, however, because farm households tend to abandon soil conservation practices once the program withdraws its assistance. The situation in the Andes is further complicated by the limited productivity of agriculture and by market failures. As a result, farm households have little interest in investing in agriculture. Although soil conservation practices have the potential to increase agricultural productivity, farm households cannot convert these benefits into income, and this situation explains farm households' resistance to these practices.

In this case study, the main stakeholders are the users of the land—that is, the farm households—and the society (represented by the government). Two government programs, PRONAMACHCS and MARENASS, are promoting soil conservation practices throughout the Andes. These programs are not sufficient, however, to guarantee sustainable natural resource management, and they should be supported with agricultural or development policies. Several policy options are being considered to improve rural livelihoods and promote natural resource protection.

Your assignment is to design a policy for natural resource protection in the Peruvian Andes, focusing on soil conservation in particular, within a rural development strategy.

Background

Agricultural production is essential for the livelihoods of many farm households in developing countries. Because these farm households often have limited means to increase production through artificial inputs, soil productivity determines potential crop production. Thus soil forms an essential input for the livelihoods of farm households in developing countries.

On-Site Impacts of Soil Erosion

When the rainfall intensity or irrigation rate exceeds the infiltration capacity of the soil on sloping farmland, the excess water runs off the land and three processes that affect agricultural production begin: water is lost; seeds and fertilizers may be lost as they are carried away by the runoff water; and soil erosion takes place. The first two processes have a direct negative effect on crop growth. The third process has a less visible effect on agricultural production but is nevertheless detrimental. Soil erosion decreases the productivity of the soil as soil fertility, soil depth, and water storage capacity are reduced and the soil structure is degraded. Soil erosion induced by inappropriate farming practices is thus considered a major constraint to agricultural development in developing countries, and consequently a constraint to rural development and poverty reduction (Ellis-Jones 1999). It is estimated that each year 75 billion metric tons of soil are removed from land worldwide by erosion, resulting in the destruction and abandonment of 12 million hectares of arable land annually, a loss that poses a threat to food security (Pimentel et al. 1995).

Off-Site Impacts of Soil Erosion

Soil erosion can also have serious off-site impacts if the eroded soil particles are carried off-site by overland water flows and deposited elsewhere. These off-site impacts include negative effects such as pollution of rivers, silting up of reservoirs, and muddy floods that damage properties and roads. Some of these negative off-site impacts impose a direct financial burden on society (for example, the

cost of sediment removal from water reservoirs or roads), whereas other costs are less tangible and difficult to quantify. This difficulty with quantification especially applies to diffuse water pollution, which arises from many small sources in a catchment. Pollution caused by soil erosion on a single field might be negligible, but the total sum of pollution caused by soil erosion on all fields collectively can result in significant pollution of the water bodies in a catchment. Its control requires soil-conserving land management practices at a catchment scale. Large-scale land degradation due to erosion can also be considered a cost to society, because less productive land is left for future generations.

Ecosystem Services Delivered by Soil

Besides prevention of off-site impacts caused by soil erosion, it is also in society's interest to combat soil erosion because of the ecosystem services provided by soil.[1] Soil erosion threatens a number of ecosystem services, such as carbon sequestration, nutrient cycling, water retention, food and fiber production at present and in the future, the amenity of well-managed soils and landscapes, and tourism (many tourists are attracted to the ancient terraces in the Andean landscape), and cultural identity (keeping a good relationship with Pacha Mama—Mother Earth—is an important part of the identity of the indigenous people in the Andes).

Soil Conservation Interventions

Soil erosion has been of interest to policy makers and nongovernmental organizations (NGOs) for decades. Soil conservation practices have been promoted to prevent soil erosion and maintain or improve soil productivity. Common soil conservation practices are agricultural terraces, reforestation, and improved soil management (for example, use of compost or cover crops). The results of soil conservation programs in developing countries are often discouraging, however, with limited uptake of soil conservation practices among farm households. Many economists argue that a major reason for the limited adoption of soil conservation practices is that they are not financially profitable for the farm households who should implement them: the investment costs are high, but the benefits are low, uncertain, and long term, as the effects on crop production of improving degraded land become apparent only after many years (Bunch 1999; Graaff 1996). To counteract the limited short-term benefits of soil conservation, governments and NGOs intervene by providing incentives to promote these practices. In many cases, however, farm households abandon soil conservation practices as soon as soil conservation programs withdraw their assistance and incentives (Bunch 1999). This situation raises the question of whether it would be more appropriate to develop a system of permanent support for farm households implementing soil conservation practices. But others argue that soil conservation practices should be encouraged only if they are financially profitable for farm households, without accompanying incentives (Bunch 1999; Giger 1999).

Rural Poverty in the Peruvian Andes

This case study is set in the southern Andes region of Peru. Peru can be divided into three main regions: the coast, the Andes, and the Amazon Basin. The arid coastal area along the Pacific Ocean makes up around 11 percent of the total territory but is home to more than half of the total population of Peru. The majority of the cities are situated in this coastal area, and this region's industrial activities are important for the national economy. The Andes cover a third of the Peruvian territory. Because of its limited accessibility, this region has few industrial activities. The largest part of Peruvian territory (58 percent) lies in the Amazon Basin, which is largely covered with humid rainforest and is sparsely populated.

Of the estimated total population of 28 million people, about half are considered poor and one-quarter are considered extremely poor. Large proportions of the poor (34 percent) and extremely poor (56 percent) are found in the rural area of the Andes (Table 1) (Escobal and Validivia 2004). These rural poor are mainly farm households that depend on subsistence farming and nonfarm activities such as seasonal migration and handicrafts.

The Peruvian Andes region has four characteristics that affect rural development (Tapia 1996):

- *Inaccessibility.* Because of the location, altitude, slope, and physical conditions of the Andean region, access to and within the region is difficult, resulting in isolation and limited mobility.

[1] For more information on ecosystem functions and services, see Groot (2006).

Table 1: Proportion of Poor People in Peru (percentage)

Region	Poor (including extremely poor)	Extremely poor
Lima	34.1	2.8
Coast, urban	43.5	9.1
Coast, rural	62.2	24.6
Andes, urban	48.1	16.0
Andes, rural	81.2	57.4
Amazon Basin, urban	57.1	29.8
Amazon Basin, rural	71.3	43.3
Peru	53.5	23.4

Source: Escobal and Validivia 2004.

- *Fragility.* Areas with steep slopes and light soil formations are susceptible to degradation. Inappropriate management and overexploitation make natural resources even more vulnerable. Also, the economic structures (for example, markets and access to credit) are fragile.
- *Marginality.* The region hardly benefits from investments in productive activities because of its isolation and remoteness.
- *Diversity.* The heterogeneity caused by altitude, climate, and geological conditions results in many diverse ecological zones and a huge diversity of plants and animals. This ecological heterogeneity determined the development of various agricultural systems, ranging from fallow systems to permanent cropping systems and from intensive to very extensive livestock production systems.

The Agricultural Sector in Peru

Agriculture was Peru's most productive sector until the 1940s. After World War II the government facilitated foreign investment in the mining industry to meet the increasing demand for minerals. Industrial production took off in the 1950s but was dependent on the growth of mineral exports. The increasing employment in the coastal cities stimulated the migration from the rural to the urban areas. Internal demand for agricultural products for urban consumption and agroindustrial use grew rapidly between 1950 and 1975, but export demand and rural markets for agricultural products grew slowly or not at all. As a result, Peru turned from a net exporter of agricultural products into a net importer in the 1980s and 1990s (Sheahan 2001). Thanks to the expansion of agricultural land and increased productivity, agricultural production and exports have increased since the mid-1990s. The increased agricultural production and exports consist mainly of crops such as coffee, asparagus, and mango, which are grown in the coastal region. Although the production and export of Andean crops such as potato, maize, and barley increased as well, Andean producers did not benefit, because the prices of these crops dropped drastically. Whereas the incomes of agricultural producers in the coastal region and the Amazon Basin have increased since the mid-1990s, the incomes of agricultural producers in the Andes have remained the same (Escobal and Validivia 2004).

The low productivity of agriculture in the Andes is mainly due to a lack of dynamic markets (Kervyn 1988). As migration has swelled the urban population, the large-scale, modern farms on the coast have increased their production to meet increasing urban demand. Additionally, the government started to import cheap food from neighboring countries to keep food prices low. The small-scale farmers in the Andes dropped out of the market because they lacked the capital, technology, and access to markets to be able to compete. Given their low productivity, high transportation costs, and high risks, it is not profitable for them to sell their products to urban markets.

The general sense about peasant economies in developing countries is that they are tied to the wider political economy. It is assumed that the peasantry provides not only cheap food to the urban economy, but also cheap labor. This notion of functional dualism does not apply, however, to

the peasant economy of Peru. Most of the agricultural products of small-scale farmers in the Andes are traded in rural markets, not in urban markets. Barter is still common in the remote rural areas. The peasantry does not supply cheap labor to coastal urban areas either, because these areas have sufficient labor available owing to previous high migration and in fact now have high unemployment. Niekerk (1994) depicted the rural economy in the Andes as a situation in which the peasantry limps along with low-productivity agriculture and seasonal migration to rural towns within the Andes.

Soil Conservation in the Andes

Soil erosion is considered among the most serious environmental problems throughout the Andes. It is assumed that 57 percent of the land in the Andes is affected by moderate to severe erosion (Felipe-Morales 1993), resulting in low agricultural productivity. Ironically, the Andes have a long history of terracing. Before the Spanish conquest in 1532, indigenous societies built terraces to support large populations. During the empire of the Incas (between 1250 and 1532), terracing was organized as part of a systematic policy of land improvement and food security. Inhabitants of the Inca Empire were compelled to pay taxes in the form of labor, which contributed to the construction of many terraces. These terraces facilitated agriculture on steep slopes and the modification of the microclimate in order to create favorable conditions for crops such as maize and tuber crops. It is estimated that 75 percent of these ancient terraces, especially the non-irrigated terraces, are now abandoned (Treacy 1998). The region's irregular rainfall makes labor and seed investment too risky given the low crop prices obtained, so agricultural land use has shifted from predominantly cultivation of crops toward mixed farming (livestock keeping and cultivation of crops). The resulting neglect and use of terraces to graze cattle and sheep lead to erosion and collapse of walls (Inbar and Llerena 2000). Attempts have been made to rehabilitate these terraces, but doing so is difficult because traditional materials and workmanship have changed, as has the indigenous society. In the Andean economy, crop production has gone from being the main activity to just one of many income strategies of farm households. Also, communities are now more fragmented and heterogeneous, with weakened traditional authorities and abandoned traditional systems of land management (Rodríguez and Nickalls 2002).

Nevertheless, soil conservation practices such as terraces are successful in reducing soil erosion and improving cropping conditions (Posthumus 2005). Once installed, terraces also result in significant labor savings if manual tillage is applied. Taking into account the investment costs, however, terraces are only profitable if farmers take advantage of the improved cropping conditions by growing a crop with a high commercial value or by increasing production by growing two crops a year. Despite the potential benefits of terraces, the desirability of these benefits for a farm household depends on the functioning of factor and output markets. Farm households are not motivated to install terraces when they cannot convert the potential benefits into cash because of a lack of markets for agricultural produce. Although farm households in the Andes depend on agricultural production for their food consumption, they rely on nonfarm activities to generate income for meeting their other consumption needs. Therefore, it is financially more profitable for a farm household to grow crops on eroding soil than to invest in soil conservation practices such as terraces (Yanggen et al. 2002). Motivating farm households to implement terraces requires attaching immediate benefits to them. Such benefits could be created by increasing the value of agricultural production on terraces, providing other incentives linked with soil conservation, or both.

Policy Issues

Use of Incentives in Natural Resource Management

Incentives are commonly used in natural resource management. The aim of sustainable natural resource management is to use natural resources in such a way that production is adequate for present needs (short-term private objective), ecosystem services are maintained (short-term social objective), and the productive capacity is maintained for future use (long-term social objective). These objectives can conflict when present use jeopardizes the future use of the natural resource, when private use limits public use, or the other way around. In the case of soil, present agricultural practices can induce soil erosion, jeopardizing future soil fertility and causing negative off-site impacts that impose costs on society. Incentives play a role in equating private and social objectives if they conflict. If interventions favor public use at the expense of private use, incentives can be used to fund the costs

(for example, the investment costs of soil conservation practices) to the private user (the farmer). If the private user benefits from the resource at a cost to society or to future use, however, disincentives like taxes or legislation might be more appropriate. In the first case, the beneficiary pays; in the second case, the polluter. The polluter-pays principle is mainly applied in developed countries (for example, through an eco-tax) and is considered inappropriate for developing countries, because subsistence farm households would not be able to afford these taxes. Furthermore, because of the diffuse nature of soil erosion, it can be difficult to trace the source of soil erosion that is causing negative off-site impacts.

Arguments against and in Favor of Using Incentives for Soil Conservation

Soil erosion is an externality of agriculture, meaning that the cost of soil erosion is not included in the price of agricultural produce. The implementation costs of soil conservation practices, however, are borne by the farmer. As already explained, the profitability of soil conservation practices for farm households is often limited because of the high investment costs. Soil conservation programs in developing countries often provide direct incentives (such as food, money, fertilizers, or tools) to resource-poor farm households to reduce or compensate for implementation costs. The use of incentives is often justified by the argument that subsistence farm households are too poor to make huge investments and that society benefits from these investments as well. The use of direct incentives, however, has been challenged because of unintended side-effects (Giger 1999). In some cases, farm households were more interested in the incentives than in the technologies. As a result, farm households did not develop ownership of the soil conservation practices and abandoned them as soon as the funding ended and the project withdrew its assistance. Furthermore, it is argued that the incentives create a paternalistic dependency that makes a farm household believe it is unable to implement soil conservation practices without external help (Bunch 1999). Soil conservation projects are also accused of using direct incentives to achieve quick results, without paying attention to long-term impact.

Payments for Environmental Services

More recently attention has been given to payments for environmental services (PES), as society realizes that ecosystems and the services they provide are under threat owing to increasing human pressure. This emerging scarcity makes these environmental services potentially subject to trade. Payment schemes and markets are now emerging for ecosystem services in order to reward the communities, often rural, that allow for the provision of these services. In developing countries there is an increasing interest in PES because it is hoped that these schemes will have a positive effect on poverty alleviation. Most PES schemes so far have been state run, focusing on catchment management or forest conservation. These PES schemes resemble the traditional public subsidy schemes for soil protection, but more emphasis is now put on monitoring the compliance of recipients of the payments. Although PES schemes are promising methods for making private and public use of natural resources consistent, implementing these schemes is difficult: defining the beneficiaries, determining the amount of payments, and establishing rules for compliance are difficult ethical issues in a rural development context. PES are seen as a reward to poor farm households who take care of the environment and "produce" environmental services. From an efficiency point of view, however, only those who constitute a threat to environmental services provision should be paid (Wunder 2005). Thus in some cases the rural poor do not benefit from PES at all.

Increasing the Value of Soil Conservation for Farm Households

In an ideal situation, soil conservation practices should be incentives in themselves by providing benefits to the farm household. Soil conservation practices should not be seen as a goal but be incorporated in the rural livelihood strategies and ecosystem services. At present, agricultural production is not generating enough income for farm households to meet their consumption needs. The commonly grown crops (potato, maize, and barley) have a low value because these crops are imported for low prices. Farm households would find terraces more financially attractive if they grew crops with a higher commercial value, such as fruits or herbs. Yet because of the high risk of crop failure (due to unreliable climate, pests, and diseases) and high transportation costs, agricultural production in the Andes is not competitive. Farm households are competitive in growing typical Andean crops such as quinoa, *tarwi*, *oca*, *ulluco*, and *maca*, but marketing channels for these Andean crops are poorly developed.

Stakeholders

The main stakeholders in soil conservation are the users of the land (the farm households) and society. Furthermore there are many NGOs—large and small—that seek to improve rural livelihoods in the Andes. Some of these NGOs (such as Arariwa, Masal, and Cusichaca Trust) address soil conservation, but normally it is a minor component of their programs. For the purpose of this case study, two government programs are considered because these are the most prominent soil conservation projects in the southern Andes in Peru.

Farm Households

In the Andes, most farm households look for income opportunities besides agricultural production, because the revenues from agriculture are not sufficient to meet their consumption needs. About half of the net income of Peruvian farm households originates from activities other than farming (Escobal 2001). Nevertheless, agricultural production remains important for the farm household for food consumption. Farm households try to minimize variation in production, income, and expenditure—in other words, to minimize risk. Risks are taken (for instance, temporal migration to find off-farm employment) once the minimum income is assured (Kervyn 1988). Because the aim of agricultural production is mainly to meet minimum household consumption needs, Andean farm households are normally not very responsive to markets for agricultural produce. Instead of aiming for profit maximization in agriculture, farm households minimize the amount of labor allocated to agriculture (subject to the constraint of meeting the basic consumption needs) in order to pursue nonfarm income-generating activities. Nevertheless, the agricultural calendar dictates when labor is allocated to the different farming and nonfarming activities (Figueroa 1989).

Society

As already argued, society also has a stake in soil conservation that encourages the delivery of certain environmental services and reduces negative off-site impacts. Peruvian society is heterogeneous in terms of ethnic groups, culture, wealth, and political power (Sheahan 2001). Spanish descendents in the coastal region still control most of the country's wealth and political power, whereas indigenous Peruvians in the rural Andes make up the majority of the poor. The Gini coefficient for Peru is 0.498, indicating that income is unequally divided within the society (World Bank 2005). Causes of this inequality are, among other things, unequal access between urban and rural populations to education and the lack of economic and political attention to the indigenous people (Sheahan 2001).

Soil Conservation Programs in Peru

The two most important soil conservation programs in the Southern Andes are PRONAMACHCS (Programa Nacional de Manejo de Cuencas Hidrográficas y de Conservación de Suelos) and MARENASS (Manejo de Recursos Naturales en la Sierra Sur). Table 2 summarizes the main differences between these two programs.

The Peruvian government became increasingly aware of the problems with deforestation and soil erosion in the early 1980s. The government program PRONAMACHCS was launched in 1981 with the main objective of promoting sustainable management of natural resources in the Andes. PRONAMACHCS is the most important program promoting soil conservation practices like terraces, infiltration ditches, and reforestation. The program started with a food-for-work approach but now provides tools to farmers as an incentive for the implementation of soil conservation practices. According to PRONAMACHCS, lack of knowledge is the principal restriction stopping farmers from implementing soil conservation practices. Technology transfer is therefore considered to be the solution to promote soil conservation. By involving the farmers in the soil conservation activities, the program allows farmers to learn how to implement these practices and at the same time to observe the impacts. PRONAMACHCS organizes activities to implement soil conservation practices in a community once a week, under the direction of a technical engineer. In 2000 PRONAMACHCS worked in 866 watersheds in the Peruvian Andes and was estimated to reach 232,772 households. The area with soil conservation practices was estimated at 38,920 hectares, with the majority of this area consisting of terraces. PRONAMACHCS applies a top-down approach where the technical engineer is responsible for deciding on the type and location of soil conservation practices. This approach results in catchment management plans and widespread implementation of soil conservation practices, especially on degraded soils in the upper parts of the catchments. Because PRONAMACHCS takes the lead in implementation, some farm households

Table 2: Main Distinguishing Features of PRONAMACHCS and MARENASS

Feature	PRONAMACHCS	MARENASS
Aim	Natural resource management, soil conservation	Improvement of rural livelihoods, soil conservation incorporated into technology package
Approach	Top-down	Grass-roots level
Duration of program	20 years	4 years
Level of intervention	Andes	Pilot project in southern Andes
Operation	Activities once a week, directed by technical staff	Frequency and type of activities decided by participants
Who decides on location and type of soil conservation practices	Technical staff	Participants
Extension	Knowledge transfer from technical staff to participants	Farmer-to-farmer extension, farm visits
Incentives	Tools for work	Farmer competitions, awards (money)

develop little ownership of the soil conservation practices and abandon some of them.

In 1998 the Peruvian government launched the pilot program MARENASS. MARENASS works in a community over a four-year period. The program's main objective is to improve rural livelihoods by facilitating a range of activities such as improvement of grassland, soil conservation, house improvement, horticulture, construction of sanitary facilities, animal breeding, construction of corrals, production of handicrafts, public works at the community level, and improvement of community dynamics. The distinctive feature of the program is its participatory, demand-driven approach. Farmer competitions are organized to motivate participants to undertake new activities. At the community level, farm households compete in their performance and uptake of new practices. At district level, communities compete against each other as well. Cash awards can be won at each competition. The knowledge about new technologies is transferred through farmer-to-farmer extension methods and is driven by community demand. In total, MARENASS has worked in 360 communities, reaching about 33,000 households (Zutter 2004). Farm households also decide themselves on the type and location of soil conservation practices they will implement, if any. Although this approach has resulted in an increased sense of ownership of the soil conservation practices among farm households, implementation has been limited and terraces have been installed solely on the more productive soils, in order to intensify agricultural production, rather than preventing soil erosion in the catchments. The program's impact on controlling soil erosion is therefore disputable.

Policy Options

Although programs are important instruments in the initial adoption of soil conservation practices, whether farm households continue to use these practices is influenced by market and policy-related factors. A farm household will only implement and maintain soil conservation practices if it provides sufficient permanent benefits. This section presents several policy measures to promote soil conservation representing different views on the issue of soil erosion and rural poverty in the Andes. These measures are not exclusive and could be combined into a national policy for natural resource management.

Policy Measure 1: Empowerment of Farm Households through Participatory Approaches

Past soil conservation programs have seen farm households as part of the problem rather than the solution. Knowledge transfer was considered to be the solution to persuade ignorant farm households to adopt the "right" technologies developed on experimental farms. If these approaches failed to consider the needs and priorities of farm households, however, a lack of ownership became an important constraining factor for continued adoption of soil conservation practices. Participatory approaches such as MARENASS aim to address the problems and interests of farm households rather than imposing the program objectives on participants. Participatory programs encourage farm households to take charge of solving their problems. Active farmer participation is central to this approach, and indigenous knowledge, experimentation, and adaptation are seen as crucial to developing appropriate practices that address farm households' needs and conserve natural resources in a way that is compatible with their farming systems (Kessler 2006). Soil conservation might receive less attention in participatory programs, however, because other more urgent needs of farm households (such as access to education, health care, or credit) are likely to be prioritized.

Policy Measure 2: Provide Permanent Support for Soil Conservation

Achieving the full benefits of soil conservation interventions often takes longer than the lifespan of a soil conservation project. Therefore, a soil conservation project should be embedded in an ongoing national or regional program that facilitates the maintenance and implementation of soil conservation practices after project closure (Bodnár 2005; Kessler 2006). For example, large numbers of terraces were constructed during the Inca Empire in order to enhance the government policy of food security. Because terracing was considered important for the sustenance of society, inhabitants were forced to supply labor for a limited period as a national service. Likewise, if a current society (or government) prioritizes soil conservation in national development plans, a permanent support system should be developed to promote soil conservation. The national program PRONAMACHCS could be continued and improved, whereby terracing would be considered a form of public work (like road construction), carried out by farm households but paid for by the government. Permanent government support for soil conservation is controversial, however, as soil conservation practices are implemented on private or communal land and not everyone will have access to or directly benefit from it (in contrast to roads).

Policy Measure 3: Payments for Environmental Services

As discussed earlier, there is an increasing interest in using PES schemes in natural resource management. Compensation for environmental services revalues the role of rural spaces and communities within society. PES are based on the principle that people who benefit from environmental services should compensate those who make it possible to generate these services. Subsidies or transfer payments (the transfer of funds between buyer and seller through intermediaries) can be given to the provider of environmental services as remuneration for specific actions or practices. Implementation of these schemes, however, is not always straightforward. It is difficult to quantify the services provided and their value in monetary terms for beneficiaries. Furthermore, ensuring that the money is spent properly on environmental stewardship can be even more difficult (Wunder 2005). In the case of soil erosion, negative off-site impacts will be prevented only if the majority of the land users in the catchment apply soil conservation practices. Even then, soil erosion might still occur owing to natural events that are beyond human control (such as extreme rainfall).

Policy Measure 4: Improvement of Infrastructure

Improvement of infrastructure is a vital component in the development of remote rural areas. Infrastructure investment can reduce transaction costs and improve market integration, which facilitates rural development (Escobal 2005). Improved access to markets for food crops can stimulate farmers to invest more in agriculture in order to increase this production. Investment in soil conservation practices such as terraces becomes financially attractive when these terraces enable the production of cash crops on sloping or marginal land. Adoption of such practices is only likely to happen, however, when agriculture is the main livelihood strategy for farm households. Improved infrastructure would also improve access to off-farm labor markets, and in this case, farm households would turn to off-farm activities and seasonal migration as their main livelihood strategies and decrease their investments of labor and capital in agriculture. The incentive to invest in soil conservation thus declines as farm households' dependence on agriculture for their livelihoods decreases (Posthumus 2005).

Policy Measure 5: Promotion of Andean Crops

Another way to improve market integration and enhance agricultural production is by promoting the consumption and export of typical Andean crops. This strategy would require investments in the entire food chain but would improve the economic position of farm households in the Andes. The marketing of Andean crops could be strengthened by incorporating environmental attributes, such as soil conservation, into the production process through certification. Certification and labeling of agricultural products is another compensation mechanism to reward environmental services (see policy measure 3). This mechanism assumes that consumers are willing to pay more for products using environmentally friendly production processes (Rosa et al. 2003). Vertical marketing systems in particular (in contrast to conventional market channels) are likely to be beneficial for soil conservation. Vertical market channels are coordinated systems where members aim at common goals in order to achieve greater efficiency and effectiveness in market functions such as those related to improving quality, marketing high-quality products, delivering services, branding, and increasing market power. Vertical marketing systems stimulate long-term planning horizons for farm households, allowing stable market relationships and a higher commitment to soil conservation. Coordination of marketing functions makes vertical marketing systems more able to stimulate and maintain a common marketing policy, which is particularly important for the production and marketing of environmentally friendly products (Castaño 2001). In such a system, agricultural products can be promoted (among consumers as well as producers) as having limited environmental externalities, such as soil erosion.

Assignment

Your assignment is to design a policy for natural resource protection in the Peruvian Andes, focusing on soil conservation in particular, within a rural development strategy.

Additional Readings

All recommended readings are available on the Internet.

On Rural Livelihoods in the Andes

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On Economic Aspects of Soil Erosion

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On Using Direct Incentives for Soil Conservation

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On Payments for Environmental Services Schemes

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Chapter Twenty-One
Environment and Health in Rural Kazakhstan: Linking Agricultural Policy and Natural Resource Management to Rural Welfare (8-3)

by Andrew Jones

Executive Summary

Oil revenues and foreign investment in the Caspian Sea's burgeoning petroleum industry have brought Kazakhstan to the attention of governments and businesses worldwide. While Kazakhstan has made considerable economic strides in the past decade, an increasing urban-rural divide has placed poverty and ill health disproportionately on the shoulders of rural residents. The country's bleak state of rural welfare in the past 15 years is largely explained by its inheritance of degraded natural resources from its Soviet forebears, the economic and social turmoil following the collapse of the Soviet Union, and inequitable, poorly implemented land reform and agricultural policies.

Throughout the 20th century, short-sighted environmental policies aimed at enhancing industry and manufacturing helped transform the Soviet Union into an industrial behemoth and world superpower. But this industrial growth transformed the landscape, notably in Kazakhstan, at the expense of the region's rich underlying natural resources. Fragile rangelands and pasturelands were plowed under to grow wheat, arid steppes were deluged with irrigation water to sustain a cotton monoculture, and rivers, seas, and lakes were drained of their vitality and poisoned with industrial effluents. Myopic policies led to a deterioration of air, water, and land; not surprisingly public health in these regions began to plummet as well.

After the collapse of the Soviet Union in 1991, Kazakhstan emerged as an independent state caught in a social upheaval, characterized by mass-scale corruption and power struggles, reshuffling of landownership patterns, and an economic downturn that affected agricultural productivity. With the development of its fossil fuel reserves, Kazakhstan has improved its economy, but not to the benefit of all. Although individual farms (that is, family and household farms) are increasing in number and showing superior productivity compared with corporate farms, legislative, financial, and technological impediments prevent smallholder operations from prospering. Local governments lack the authority and funding to carry out state mandates, resulting in ineffective development programs, poor implementation and enforcement of state policies, and escalation of wealth consolidation by powerful private citizens. In short, Kazakhstan lacks a cohesive infrastructure to support rural development and agriculture. A declining fodder base from prior rangeland mismanagement, shifting grazing patterns, antiquated irrigation systems, and imperiled watersheds threaten the viability of natural resources. Thus, future polices must seek to overcome a severely degraded environment in addition to inefficiencies in government and infrastructure.

Although efforts are underway to diversify the economy, agriculture is still not a high priority for the government of Kazakhstan. The poor health and welfare of Kazakhstan's millions of agriculture-dependent rural residents highlights the paramount importance of immediately addressing issues of agriculture and rural development. Rural families cannot afford to wait for the Kazakhstan of 2030, the country's ubiquitous propaganda slogan, to fulfill their simple hopes of health and social stability.

Your assignment is to advise the government of Kazakhstan on how best to reform and integrate its policies on land tenure and agriculture with proper stewardship of natural resources to improve rural health and welfare.

Background

Kazakhstan is the second-largest republic among the Commonwealth of Independent States (CIS)[1] and, at 2.7 million square kilometers, is about four

[1] The Commonwealth of Independent States (CIS) unites Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, and Ukraine.

times the size of Texas (CIA 2007). It is predominated by vast steppes and expansive grasslands; almost all the territory of the country belongs to the largest riverless area on earth (Baydildina et al. 2000).

The territory that is now Kazakhstan has changed hands numerous times throughout history. It was first part of the Persian Empire, then the Mongol Empire, and eventually came to be ruled by Russian tsars and finally Soviet Russia. As early as the 16th century, however, a distinct Kazakh culture, with common linguistic and familial ties, emerged. These people were herders, nomadic pastoralists, who lived transient lives in constant search of fresh pastureland to support their livestock-based economy. The region's endless steppes and semi-desert land provided ample grazing to support the small population.

Soviet Era Mismanagement

The Virgin Lands Campaign. The collapse of the Russian Empire following the Bolshevik Revolution of 1917 led to the emergence of republics throughout the former empire; Kazakhstan became a Soviet republic in 1936. During and after World War II there was an influx of newcomers, many of whom were forcibly exiled to the republic to work in gulags, or government work camps. The population of the republic steadily grew. In the mid-1950s, Soviet central authority in Moscow deemed that Kazakhstan's steppes and grasslands were to be brought into production to supply wheat to the Soviet Union. This ambitious program, which came to be known as the Virgin Lands Campaign, was carried out between 1954 and 1964. Kazakhstan subsequently became the third-largest grain producer and second-largest net exporter among Soviet republics (Meng et al. 2000).

More than 300,000 people, mostly Ukrainians, arrived in northern Kazakhstan to begin farming the more than 300,000 square kilometers of land that came under the plow. This massive shift in land use and influx of people severely disrupted the pastoralists' already endangered balance of seasonal herding cycles. Land previously employed for grazing was plowed under for wheat production and received heavy inputs of fertilizers and chemical pesticides.

The first harvest was a remarkable success, with more than half of the Soviet Union's 125 million metric tons of grain produced in 1956 coming from one eighth of the Soviet Union. Thereafter, however, harvests steadily declined, and by the 1960s the soil had been so drained of nutrients beneficial to wheat that productivity languished.

The continued conversion of pastureland to agricultural land during the 20 years from 1960 to 1980 led to deterioration of soils and loss of productivity on many of the best rangelands in Kazakhstan; the fodder base was drastically reduced. Because of the abandonment of farmland converted from rangelands following the Virgin Lands Campaign's short success, 12.8 million hectares of land previously planted to wheat were no longer in use by 2000. Research from the Kazak Fodder and Pasture Institute has shown that full recovery of these abandoned steppe lands would take 30 years (Schillhorn van Veen et al. 2004). Further ecologically risky policies in the 1970s promoted livestock development and the creation of large livestock farms for the production of meat and wool; these programs quickly led to rangeland overgrazing and deterioration (Schillhorn van Veen et al. 2004).

Kazakh livestock production was fairly centralized under the Soviet Union. Rural herders relied on stored fodder during the winter and obtained essential provisions and services from the government. The declining land productivity and the difficult transition in the mid-1990s away from collective and state-owned farms forced many livestock owners to sell off herds to maintain agricultural production or to pay off debts (Schillhorn van Veen et al. 2004). Sixty percent of the livestock herd nationwide was disposed of between 1993 and 1999, with corporate farms slaughtering, exporting, or selling 90 percent of their inventories (Dudwick et al. 2005).

White gold. A decade before the Virgin Lands program, in the southern part of the Kazakh republic and throughout much of the Uzbek republic, irrigated cotton became the "white gold" boasted about by Soviet elites. Moscow had begun a campaign to achieve self-sufficiency in cotton production, relying on the drylands of the Aral Sea basin for its cultivation. Irrigation projects were begun on a massive scale (Feshbach and Friendly 1992).

The land use changes ushered in bumper harvests during the first decade of cultivation. The area of irrigated land grew by more than 30,000 square kilometers between 1950 and 1988, mostly in

southern Kazakhstan, Uzbekistan, and Turkmenistan.

But poorly designed irrigation schemes, shortsighted planning, and corruption at all levels of the process soon revealed the plan as a disastrous pillaging of natural resources. Water withdrawals were made indiscriminately to support this massive increase in irrigated area. River flow diminished until 97 percent of annual water resources were consumed, leaving only four cubic kilometers to flow into the Aral Sea. In some dry years in the 1980s, no water at all flowed into the Aral Sea (FAO 2003). The waters of the Syr Darya and Amu Darya, the sea's two feeder rivers, were diverted into a network of unlined irrigation furrows that wasted at least half—and sometimes as much as 90 percent—of the water intended for the cotton fields. Despite elaborate drainage networks consisting of more than 100,000 miles of drains, the system was so poorly engineered that water tables rose to within a foot of the surface from original depths of more than 30 feet. Waterlogged fields led to the salinization of soils and a subsequent decline in agricultural productivity. As productivity plummeted, peasants were forced to compensate for the lost harvests by converting their private plots and orchards to cotton cultivation. These private plots had not only supplied fruits and vegetables, but also helped to hold fractional amounts of moisture in the soil. Hunger and malnutrition spread. The profits of the cotton monoculture remained with the political elite, while the land once used for grazing livestock or growing produce was continually converted to cotton production (Feshbach and Friendly 1992).

Desertification has encroached on more than 2 million hectares in the Aral watershed. The city of Aralsk grew up around a fishing industry that had thrived on the sea's abundant flounder population. The Aral's waters used to lap against the main city dock not more than a 10-minute walk from the central market. Now, a three-hour overland journey across the former sea bed is required to reach the sea's shores. The rusted hulls of enormous fishing vessels rise up from a sea shell–littered desert floor—testaments to the region's former marine landscape. A total of 13 fishing enterprises once operated in the Aral region; more than 10,000 people lost their jobs with the recession of the sea's shores. In the Kyzylorda oblast[2] where the sea is located, three-quarters of the 16,000 unemployed people in 1995 were from rural areas, and nearly all of them were forced to leave owing to the halting or partial cessation of fishing operations (UNDP 2004).

A utopian quest. The Soviet ethos was steeped in defying and controlling the environment. Its identity relied on surmounting the insurmountable—at least on paper. The mismanagement and poor design of the cotton irrigation systems in the Aral basin were only the first and most visible component of a bumbling system that undermined the sustainability and promise of a Marxist utopia. "The utopian quest became a blinding compulsion ... that justified destruction and deceit on a huge scale in the name of progress toward an earthly paradise" (Feshbach and Friendly 1992, 28). The quest would prove to be folly. Soviet policies aimed at the unsustainable exploitation of natural resources in Kazakhstan undermined the republic's ability to reap economic gain from its endowed resources. The republic was left ill prepared to adjust to the social, economic, and political upheaval that followed the precipitous collapse of the Soviet Union in 1991.

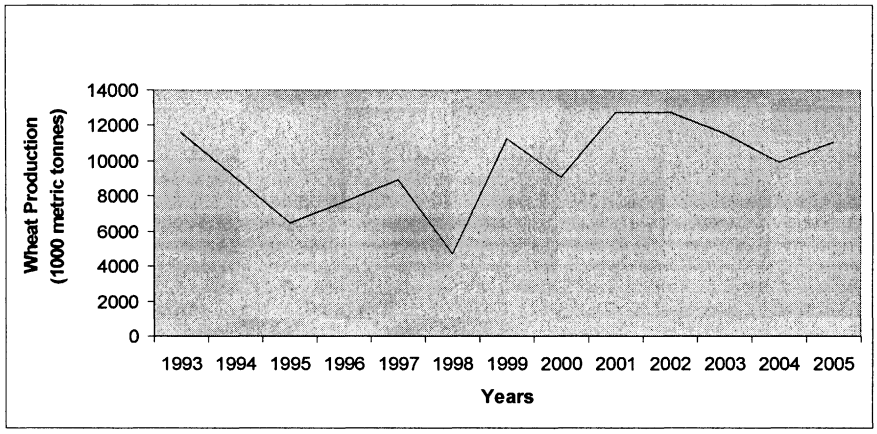
The Post-Independence Market Transition

The agricultural sector. The collapse of the Soviet Union threw the economy of the newly independent nation of Kazakhstan into a tailspin. Agricultural production plummeted. By 1998 meat and wheat production, previously robust, had fallen to less than half of their 1993 levels (FAO 2006) (see Figures 1 and 2). The decline in production resulted from numerous factors.

Agricultural sector losses were caused primarily by a continuation of state controls on marketing (which depressed output prices) while input prices were liberalized (Gray 2000). The state's withdrawal from pricing policy regulation led farmers to pay increasingly high prices for inputs, energy resources, and maintenance while earning ever smaller profits for their products. During the post-collapse reform years from 1992 to 1995, prices for industrial production and technical services increased almost 27,000 times, while those for agricultural production increased only 3,948 times. To buy one ton of fuel, producers of agricultural

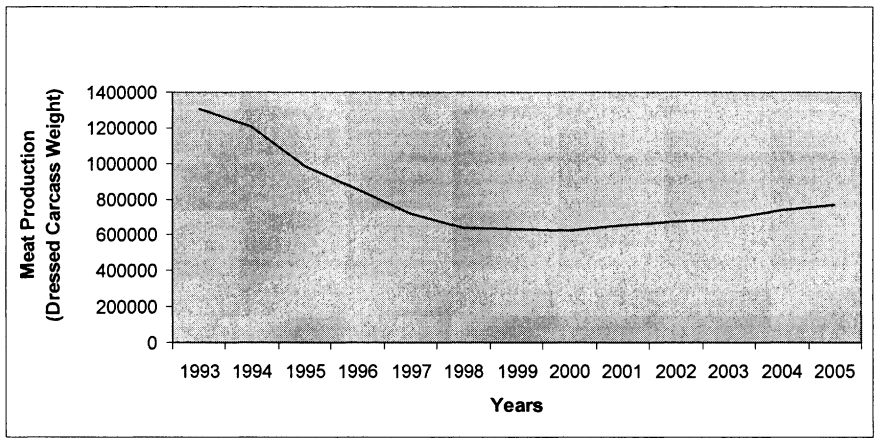
[2] Oblast is a term used in Eastern Europe and throughout the former Soviet Union to denote a subdivision of a nation similar to a province or region.

Figure 1: Wheat Production in Kazakhstan, 1993–2005



Source: FAO 2006.

Figure 2: Meat Production in Kazakhstan, 1993–2005



Source: FAO 2006.
Note: All data shown relate to total meat production from both commercial and farm slaughter.

commodities had to sell 2.0 to 2.5 metric tons of grain. Soviet era combines and aging machinery prevented growth in the sector. Labor remuneration decreased as well, with producers of agricultural commodities bearing substantial proportions of the production costs while receiving compensation for only 20 to 30 percent of the final price (Baydildina et al. 2000).

The government's withdrawal from economic development placed market regulation in the hands of monopolists who continued to impose basic input costs on farmers while increasing their own profit shares. The state's refusal to finance and provide credit support to producers of agricultural commodities, in addition to reductions in state spending overall and for the agricultural sector in particular, amplified the difficulties faced by agricultural producers (Baydildina et al. 2000).

The economies of the republics of the Soviet Union were highly integrated with centralized support for different sectors. After the collapse of the Soviet Union, Kazakhstan's agricultural sector faltered without this support and integration. Kazakhstan's livestock sector, for instance, traditionally relied upon Russian markets and meat-processing facilities, and the decline in the livestock

sector in the 1990s resulted largely from this loss of integration. As privatization of farms began to increase in the early 1990s, small-scale farmers faced the difficulty of managing a private operation without the technical and resource assistance of a central planning system or the support of a farm collective. The emphasis on research and technological development present during the Soviet era disappeared; to further complicate matters, farm equipment and machinery passed down to farmers of the newly independent nation were from a bygone era and were largely rusting into obsolescence (World Bank 2004).

Severe weather events—an oppressive drought in 1998 and continued severe weather in 1999 and 2000—combined with the degraded land resources inherited from the environmentally negligent Soviet system were other key factors in the decline of the agricultural sector. Ill-advised land reforms exacerbated the sector's economic downturn.

Land tenure reform. Under the Soviet Union, nearly all rangelands and agricultural lands were state owned and used by state (*sovkhoz*) and collective (*kolkhoz*) farms. Following independence most of these farms were dissolved, and laws were enacted to regulate land use. Efforts to privatize land shares began in 1993 with the in-kind distribution of property shares to former members of collective farms. The goal was to reduce the size of corporate farms, restructure them, and increase the number of family farms. From 1993 to 1998 the area of agricultural land classified as family farms increased fivefold, while corporate farms declined by two-thirds. Although some of this corporate farmland area was transferred to family farms, most of the land was marginally productive and simply removed from cultivation (Dudwick et al. 2005).

Farmers did not easily transition into a private-holdings system. Most were accustomed to the financial and technical support present in larger-scale collective farm operations, not to mention the security of state-backed inputs and guaranteed markets within the republics of the Soviet Union. The new regulations were largely ineffective, as property owners simply reunited to form production cooperatives; little change in patterns of ownership, management, or control emerged (Gray 2000).

Corruption played a major role in the transition as well. Those with the influence and the means (namely the head, or *kolkhoznik*, of a collective farm) commonly seized lands for themselves. People with independent land shares were often duped into leasing shares to restructured farms that avoided lease payments, effectively severing any ownership ties to the land. Lack of oversight and poor enforcement of regulations contributed to the unbalanced landownership patterns in the years following independence.

The limited progress in restructuring ownership patterns resulted largely from the fact that former state and collective farms were never subjected to hard budget constraints. By 1998 the overwhelming majority of remaining corporate farms were unprofitable, and a debt crisis ensued that led to the buyout of many farms by large, vertically integrated grain companies. In 1998 the government passed the Bankruptcy Law, which began to encourage the liquidation of insolvent and unviable farms (Gray 2000).

Rural welfare in Kazakhstan today. In the past 10 years Kazakhstan has made larger strides in improving its health and economic situation than have the neighboring Central Asian republics (United Nations 2005). The former Soviet republic has also received increased attention from foreign governments and international investors owing to its sizable oil reserves in the region of the Caspian Sea as well as its mineral and natural gas reserves. These factors give the impression that the welfare of the Kazakh people is on the rise; the country is beginning to experience, however, a stark rural-urban divide.

Rural poverty in Kazakhstan has gone from being twice as high as urban poverty in 2001 (38.5 and 20 percent, respectively) to almost three times as high in 2004 (24.8 and 9.2 percent). Oblast of residence is the strongest determinant of poverty in Kazakhstan. The largely rural Kyzylorda, South-Kazakhstan, and Mangystau oblasts show considerably higher poverty levels (>18 percent) than do the eastern oblasts or the intensively developed cities of Astana and Almaty (1–3 percent). Opportunities to earn sufficient income for an adequate standard of living are considerably less in rural areas. Most of the economic activity of the country (trade, service, construction, and oil and natural gas extraction) is centered in urban areas. Little investment, public or private, is being funneled into the agricultural sector or rural economies. Though wages have risen, the agricultural sector provides relatively low incomes, especially in the traditionally agricultural southern regions. In 2004 the ratio

between the highest and lowest poverty rate in oblasts was 26.5—compared with 4.1 in 1999.

The urban-rural divide is highlighted starkly when placed against the backdrop of declining health, which plagues mostly rural populations. Although discrepancies in data exist owing to differences in measuring outcomes, the Demographic and Health Surveys conducted in Kazakhstan in 1995 and 1999 showed that over 10 years (1989–1999) the infant mortality rate increased by 24.5 percent and the under-five mortality rate increased by 26 percent. Distribution of child mortality by region showed that losses were biggest in the southern region (34.6 percent), a little less in the western region (21.6 percent), and lowest in the eastern region (9.1 percent) (the southern and western oblasts are far more rural than the eastern oblasts). Similarly, micronutrient deficiencies are more prevalent among rural populations: prevalence of iron deficiency anemia among pregnant women increased from 58 percent in 1999 to 63.4 percent in 2003. Vitamin A deficiency was found in 28.6 percent of children 6–60 months old. This level exceeds the 20 percent threshold beyond which the World Health Organization (WHO) considers vitamin A deficiency a serious problem, and it indicates inadequate health status and health care in the country, especially among the rural poor.

The anti-poverty Targeted Social Assistance (TSA) scheme was introduced in January 2002 to bolster existing social assistance programs. Local governments are fully responsible for organizing and delivering TSA (ILO 2004). The 2001 Law on Local Public Administration in Kazakhstan defined the role of local councils and executive bodies as implementing state policy. Local budgets are supposed to finance TSA as well as education and health services, but these mandates are largely unfunded because localities cannot independently establish tax rates or determine the tax base (Dudwick et al. 2005). Most local governments lack the support and autonomy necessary to effectively implement and monitor such social programs. Whereas satisfaction with provision of basic services such as electricity, gas, drinking water, and telephone are high, a lower percentage of households now benefits from a range of social services (medical care, public transportation, heating fuel, school subsidies) than did so before the dismantling of collective farms (Dudwick et al. 2005). In addition, perceptions of levels of crime, domestic violence, and alcohol use among youth and adults have also risen markedly, indicating a pervasive social instability despite advances in basic infrastructure.

Linking resources, policy, and people. Health statistics in Kazakhstan today demonstrate that despite progress toward meeting the Millennium Development Goals, government efforts at addressing public health have not affected all citizens equally. Rural residents—those most closely tied to the land and other natural resources for their livelihoods—seem to carry a disproportionate burden of the nation's health woes and social instability. The management of natural resources and the sustainable and efficient use of agricultural resources are intrinsically linked to the policies that dictate patterns of ownership. The stewardship of such resources affects the health and welfare of those who depend on the resources directly, and even indirectly, for livelihoods and as a place to live and prosper.

Agricultural production has steadily recovered since the start of the new millennium. Wages and agricultural prices have increased. These gains have been driven largely by Kazakhstan's wealth of petroleum, natural gas, and mineral reserves and the global rise in oil prices. The gains in the energy sector, however, must not overshadow the fact that this wealth is unevenly distributed and does not reach those most disenfranchised by the market transition. The growth in disparity between urban and rural poverty reflects the need to bolster support for rural livelihoods. Redressing such health and poverty discrepancies will involve examining fundamental issues of natural resource management, land ownership, and agricultural policy.

Policy Issues

Sustainable Agricultural Production

Though agricultural output declined in Kazakhstan throughout the 1990s, total output increased at an average real annual rate of 8.2 percent between 1998 and 2003, with agricultural production growing by an annual average of 10.5 percent (World Bank 2004). Despite gains, however, agriculture contributes only 8 percent of Kazakhstan's gross domestic product (GDP), and agriculture's share in the economy has shrunk owing to growth in the extractive petroleum industry. The agricultural sector has significant untapped potential, given that both crop yields and livestock productivity are well below levels reached in countries with analogous environments (World Bank 2004). Individual

(family and household) farms seem uniquely able to fill the current deficits in agricultural productivity, but an adequate legislative, financial, and knowledge infrastructure in Kazakhstan does not exist to support these farms and the rural residents that depend on them for livelihoods and welfare.

The number of individual farms and the arable land area managed by these farms have more than doubled in Kazakhstan since 1998 (World Bank 2004). This change in farming scale affects farmers in northern and southern Kazakhstan differently. In rainfed northern Kazakhstan crops are grown on a large scale as part of machinery-dependent corporate farms, whereas in the south farming is heavily dependent on labor and irrigation water and family farms predominate. Currently about 40 percent of cultivated land is in individual farms nationwide (Dudwick et al. 2005).

Until about 1998 yields from individual farms were somewhat higher than from corporate farms, but this efficiency gap widened in 1999 and continues to grow as the gains corporate farms made by taking marginal land out of production have waned. Much of the profitability of corporate farms depends on government support and credit programs (supported through oil revenues), but even with this assistance, nearly half of all corporate farms remain unprofitable (Dudwick et al. 2005). A clear discrepancy exists between land tenure reform measures that are pushing to eliminate share privatization in favor of concentrating corporate farm ownership and management and the lack of efficiency and profitability of such farms; perhaps partly due to Article 170 of the 2003 Land Code, the land area dedicated to individual farms has grown more slowly in recent years than in the 1990s (Dudwick et al. 2005).

In 2003 the Ministry of Agriculture developed two programs to stimulate agricultural growth and rural development: the 2003–2005 State Agro-Food Program and the Rural Development Program (RDP). These programs aimed to increase state support of agriculture, strengthen linkages between agricultural research and agricultural policy, and improve the legal framework for agricultural growth and rural development. The State Agro-Food Program, which earmarks a percentage of the state budget for support of agriculture (8 percent in 2003), allows agricultural producers a 40 percent subsidy on inputs such as fuel, lubricants, seeds, and fertilizers. Bureaucratic requirements, however, appear to act as a disincentive for small farms to gain access to these subsidies (Dudwick et al. 2005). Moreover, credit from commercial banks favors large farms; small farm credit, especially long-term credit for equipment purchase, is wholly inadequate. Any farmer may lease agricultural machinery at subsidized interest rates, but such machinery is usually more appropriate for larger farm operations (Dudwick et al. 2005). These policy measures seem motivated by a desire to promote rural development but miss the mark in establishing equitable access to incentives and benefits that might assist small-scale farmers.

Many rural managers of individual farms face the additional challenge of maintaining viable operations with little farming experience, meager knowledge of how to manage the business of farming, limited access to technology, and lack of research support. The research, technological development, and knowledge dissemination infrastructure that underpinned the state and collective farm systems of the Soviet era largely vanished after the collapse of the Soviet Union. The crop of inexperienced private farmers that emerged at the same time has left enormous gaps in the potential for agricultural productivity and sustainable livelihoods among Kazakh farmers. Ten agricultural research centers employing more than 1,200 scientists are funded by just 0.3 percent of agricultural GDP. These centers seek commercial funding to supplement their limited public resources, and as a result, research responsibilities are often neglected to prioritize the interests of donor institutions. Most important, these centers lack a system to disseminate agricultural research findings and new technologies to agricultural producers (World Bank 2004).

Kazakhstan also faces the issue of agricultural diversification. Wheat and cotton together account for 90 percent of agricultural exports. Though the country has traditionally relied on land-intensive agricultural products such as wheat instead of labor-intensive fruits and vegetables, limiting the diversity of agricultural products potentially limits economic development and the opportunity to improve and expand rural livelihoods. More value-added, labor-intensive products like fruits and vegetables could offset high transport costs and single crop dependency (World Bank 2004).

Kazakhstan must find a way to equitably promote sustainable agricultural production by creating appropriate incentives and an accessible rural development infrastructure that supports not only

large farms and corporate farms, but also the more productive individual farms that provide income and livelihoods to millions of rural families.

Land Tenure Reform

A great deal of confusion surrounds land tenure reform issues in Kazakhstan. Despite the ostensibly egalitarian land share distribution following independence, only about 37 percent of households actually received physical land plots during land reform. Many households remain unsure of their rights as land share or land plot owners (Dudwick et al. 2005).

Many former farm managers, outside the corporate farm system, retained their primary land tenure rights and leased land from the state following independence. Leasing and subleasing arrangements led to unsustainable land use practices. Lessees and sublessees neither owned nor had secure land tenure of the properties they worked, and therefore had no real stake in the long-term viability of the land (Schillhorn van Veen et al. 2004). As part of the 2003 Land Code, which allows for private ownership of land, the government outlawed share subleasing. Article 170 of the code required subleased land shares (primarily the shares of pensioners, social and cultural workers, and the poor) to be returned to the government by January 1, 2005, if not purchased, transformed into a physical plot, or transferred to a corporate farm. The aim of the measure was to end share privatization and concentrate corporate farm ownership; this measure likely reduced the amount of land in individual farms, which were largely the subleasers of land (Dudwick et al. 2005).

Institutional oversight of both private and state-owned land is another challenge facing Kazakhstan. Land allocation and management under Soviet authority was regulated by the Ministry of Agriculture; land use management schemes focused solely on economic and production interests. Following independence, these responsibilities shifted to the Land Resource Management Agency, which had a broader mandate to manage issues concerning land tenure, land use, and price plotting. The management roles of these two government institutions as well as the Ministry of Environment may need to be more clearly delineated to provide for efficient land management oversight. In addition, the sheer size of the country, combined with its dispersed, low-density population, necessitates greater local responsibility for the oversight of land management and reform issues (Schillhorn van Veen et al. 2004).

Kazakhstan faces the additional hurdle of cultural perceptions when considering the land tenure question—for centuries the notion of private property did not exist among the nation's nomadic peoples. The traditional Kazakh economy of nomadic livestock production was based on grazing cycles from winter to summer pastures; the conservation of resources and nature was paramount. Many Kazakh pastoralists are still becoming acquainted with this foreign model of land tenure while at the same time struggling to maintain their identity and pride.

The challenge of land tenure reform in Kazakhstan rests in the clarity and equality of future policies. A 2003 survey found that while 60 percent of households interviewed thought land allocation was fair (though at the time of the interview, Article 170 had not come into effect), many rural inhabitants were unclear about the process of land reform and their rights as land share and land plot owners (Dudwick et al. 2005). Legislation such as Article 170 of the 2003 Land Code has helped to shift the distribution of land in Kazakhstan away from individual farms and toward corporate farms, while at the same time rural residents remain confused about their rights and the range of opportunities available to them for benefiting from their land entitlement.

Responsible stewardship of the natural resources, upon which current and future agricultural productivity and rural livelihoods depend, represents an even greater challenge for Kazakhstan.

Rangelands

Sixty percent of the livestock herd in Kazakhstan was disposed of between 1993 and 1999 (Dudwick et al. 2005).[3] There are many reasons for this decline in livestock populations: the halting of import and subsidized delivery of feed, the breakdown of the water supply system, the need for debt repayment, massive emigration from the country, the use of livestock in barter during the period of rapid inflation following the Soviet collapse, the breakdown of transport between remote farms and markets, and declining urban purchasing power. Livestock inventories plummeted from an estimated 9.7 million head of cattle before the Soviet collapse to

[3] This section draws on Schillhorn van Veen et al. (2004).

4.5 million in 2002. Likewise, inventories of sheep and goats stood at 35.6 million before 1991 and declined to 10.6 million by 2002. Whereas corporate farms liquidated the large majority of their livestock, only 5 percent of the inventories of individual and family farms were eliminated (Dudwick et al. 2005). Livestock holdings are now widely dispersed across a large number of family farms and smallholders—private ownership in the livestock sector is currently estimated at 92 percent. The total number of households depending on livestock has increased during the past decade to an estimated 1.6 million.

The private herds of individual and family farms are small and lack public support. The continuous decline in livestock yields since the late 1990s can be explained by lack of marketing, feed, fodder, and veterinary services, as well as other public support targeted toward smallholders (Dudwick et al. 2005). The lack of organization of long-distance grazing has resulted in overgrazing and deterioration of pastures around inhabited areas. More distant pastures have been abandoned as the rural populations that once tended their flocks there have left. Deterioration of pastureland is threatening the critical fodder base in the country.

Fodder is an important rangeland resource. Hay collection from natural pastures has traditionally been a crucial component of livestock husbandry. In northern areas winter feeding depends largely on stored fodder, and in southern regions traditional seasonal migration systems provide for optimum fodder availability. The preservation of fodder has become a salient issue because of the declining incomes of rural herders and their consequent inability to migrate with their herds. Pastoralists are becoming increasingly stationary, unable to bear the risks of theft or pay the cost of herders to help transport flocks to mountain pastures in the summer. In addition, fodder storage in the form of silage[4] is not common. Plant fodder production via legumes is a common practice, but even this land use is risky as production can expand into vital grassland and can further lower water tables through withdrawals for production needs. While seasonal cycles of herding are increasingly becoming a vestige of a vanishing nomadic culture, the need remains for an integrated system of rangeland management that enables preservation of the fodder base through expanded access to pasturelands. Kazakhstan has the most extensive permanent pasture per animal in the world—this tremendous resource must not be squandered (World Bank 2004).

Water Resources

Kazakhstan is an arid country. The drier desert regions to the south receive less than 100 millimeters of precipitation annually. The proper management and conservation of water resources in the country is thus critical not only to the long-term sustainability of industries that heavily depend on water but also to the health and well-being of the more than 15 million people who depend on a consistent and high-quality water supply for domestic use (CIA 2007). Unfortunately, Kazakhstan's water resources have traditionally been exploited for short-term economic gain without consideration of the broader consequences of overdrafting and polluting rivers and seas. Nearly all of Kazakhstan's watersheds are threatened by exhaustion of supply or degradation of water quality (for example, the Ural-Caspian, Irtysh, Ishim, Nura-Sarysu, Tobol-Torgai, and Balkhash-Alakol basins), but one in particular stands apart as a high-priority area for water resource rehabilitation: the Aral-Syr Darya basin.

Perhaps more than any other example, the Aral Sea crisis defines the relationship between negligent stewardship of a natural resource and the resulting impact on public welfare. The cotton monoculture that sprang up around the sea in the 1950s has left a region marred with soil infertility, poisoned water, and chronic disease. Failure to adopt anti-erosion measures has led millions of tons of soil to simply blow away. The soil that remains suffers from increased salinization both from poor drainage and from wind depositions on fields. Per capita income in water-deficient areas across all oblasts is almost half the "official minimum living requirement" (UNDP 2004). Outmigration to urban areas is a serious problem. With the decline of the rural economy, residents increasingly seek work in urban centers, adding to population pressures in those areas and diminishing the prospects for a robust rural labor force.

Human health has also been directly affected. Long-term exposure to pesticides through inhalation in dust storms, through polluted water, or through the diet (from chemicals applied to or deposited

[4] Silage is a type of fermented forage made from grass crops such as corn or sorghum. The fermentation process preserves the forage and causes it to retain more of the initial nutrient content of the plant than hay.

climatically on agricultural fields) have allowed toxic organochlorines and dioxins to accumulate in local residents. Tainted breast milk can pass the toxins on to infants. Not surprisingly, high rates of chronic disease, mental retardation, and impaired physical development have been reported in the region (Zetterström 1999). The prevalence of respiratory illnesses and tuberculosis has also risen steadily, as have rates of cancers, hepatitis, and intestinal disease (Wiggs et al. 2003).

The Aral Sea now exists as two distinct bodies of water: the Northern Aral Sea (NAS), also known as the Small Sea, and the larger Southern Aral Sea. Under its Northern Aral Sea project, the World Bank helped build the eight-mile Kok-Aral Dam, completed in August 2005, which separates the two parts of the sea. Prior water control structures on the sea and on the Syr Darya largely failed to restore the delta or increase water levels. The ability of this new initiative to restore sea levels and river flows and sustain agricultural and fish production remains to be seen. The involvement of the World Bank in this project, as well as the support from the Rural Development Program in assisting residents of the Aral region, is a promising start to revitalization of the region. Progress is slow, however, and signs of continued misuse of resources abound.

In spite of decreases in industrial production and in wastewater discharge, pollutants from chemical industries, petroleum processing, and machine-building industries are still a major threat to surface water quality in Kazakhstan (UNDP 2004). Agricultural irrigation withdrawals from rivers remain intensive. The chemicals, salts, and other pollutants in return-flow water only further degrade water supplies. In addition, the developing industries around the oil and gas field reserves in the Caspian Sea region are aggravating a delicate ecosystem. Coastal territories are already heavily polluted by oil products.

Issues of water resource management in Kazakhstan put the relationship between health and environment in stark relief. Kazakhstan inherited the burden of degraded water resources from its Soviet forebears, but it has the moral and civic responsibility to make all efforts to rehabilitate and preserve the vitality of the country's rivers, lakes, and seas.

Stakeholders

The Land Resource Management Agency

Charged with regulating land allocation and management, the Land Resource Management Agency is the government agency responsible for reshaping the landscape of the country in terms of both land ownership and land use. The agency's success in meeting the demands of the nation's transitioning market economy will help determine the strength of the agricultural sector, the success of new private farming operations, and ultimately the welfare of the rural poor, who depend on the natural resource base to make their living.

The Ministry of Agriculture

Responsible for the State Agro-Food Program and the Rural Development Program, the Ministry of Agriculture plays a vital role in supporting rural agricultural producers. The degree to which the ministry is able to equitably provide for farmers at varying scales of operations and integrate with the missions of the Land Resource Management Agency, as well as support the budgets of local governments and research centers, will determine its potential impact on rural livelihoods and welfare.

Neighboring Central Asian States

The nations of Central Asia share a common history. They all formerly existed as republics of the Soviet Union. As part of the Soviet Union, the Central Asian republics had close trade ties with one another and their economies were interconnected. Following the breakup of the Soviet Union, trade relations between the newly independent nations initially declined but have recovered somewhat in subsequent years. Coalitions between the states are natural, given that they share watersheds and resources, trade routes extend into neighboring countries, families and shared cultures reach across borders, and the welfare of one will help determine the welfare of another. The Caspian Environmental Program (CEP) and the Aral Sea Basin Program (ASBP) are just two examples of regional collaborations designed to ensure the future of shared natural resources. Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan have not prospered to the degree that Kazakhstan has in the post-Soviet years. They rely on Kazakhstan's markets and exports to maintain the viability of their own trade and economies. For these neighboring states, helping to secure the

welfare of Kazakhstan's citizenry will only benefit their own.

Civil Society in Kazakhstan

Although thousands of nongovernmental organizations (NGOs) operate in Kazakhstan, the notion of civil society is a fairly new concept in the former communist state. The quality and organization of NGOs vary widely, with some imparting enormously helpful services to their host communities and others providing little more than an excuse to steal from the public. This sector of Kazakh society has the potential to strongly benefit the nation's rural poor. Environmental NGOs focused on the sustainable stewardship of forest lands, rangelands, and watersheds are quite active, as are those geared toward securing the livelihoods of rural farm workers and fishers affected by natural resource degradation or the social upheaval of the post-Soviet years. The seeds of a flourishing civil society exist in Kazakhstan, but they will need proper support and regulation as well as partnerships for change in individual communities.

The International Community

The World Bank has been a familiar presence in Central Asia since the collapse of the Soviet Union, helping to fund projects like the Kok-Aral Dam that recently was erected to preserve the Aral Sea and restore fish populations in the region. The International Red Cross has also been active in the region around the Aral Sea in recent years, working to restore livelihoods and fight diseases such as tuberculosis and hepatitis. Even foreign countries on the other side of the globe have taken notice of Kazakhstan in the past decade owing to its wealth of oil and natural gas reserves. The wealth flowing from foreign investment in these resources ensures that the international community will have its fingers on the pulse of the region for years to come. The support of such a far-flung community of governments and agencies could benefit Kazakhstan's people in the long term through their investments and the resulting stimulation of the economy. The key challenge for the government will be how to equitably channel the benefits of those investments to all its citizens.

Agricultural Producers

The stakes of reform's success or failure are highest for agricultural producers in rural areas of Kazakhstan. The economies of urban centers are benefiting greatly from foreign investment and the burgeoning service, construction, and banking sectors. The livelihoods of farmers, herders, and fishers are more directly tied to the land, however, and depend on the quality of existing natural resources. The majority of farmers in rain-fed northern Kazakhstan are part of large, machine-based operations, whereas those in the irrigation-dependent south largely manage labor-intensive individual farms. The interests of these two groups will differ based on the scale of incentives future policies may provide and on the resources allocated to rural development and natural resources by region. The encroachment of farms into a traditionally nomadic culture has long been a contentious issue among agricultural producers in Kazakhstan, and herders and farmers often butt heads over land issues. Herders require more open land for grazing herds, and farmers tend to want to plow that land to cultivate crops. In addition, runoff from agricultural chemicals often degrades the water quality of streams, rivers, and lakes in watersheds, thus affecting the livelihoods of fishers. Finding compromises between the diverse needs of these different stakeholders will continue to pose a challenge to Kazakhstan in the years ahead.

Policy Options

Sustainable Agricultural Production

The relatively high productivity of individual farms compared with corporate and large farms, as well as the abundant livestock resources owned by family farms and smallholders, points to the key role of these small-scale, private agricultural producers in supporting the economic foundation of Kazakhstan's agricultural sector. Policy options centered on sustainable agricultural production should first and foremost look to sustaining these producers.

The creation of the State Agro-Food Program and Rural Development Program has demonstrated the Ministry of Agriculture's initial willingness to take issues of rural poverty and agricultural assistance seriously. Bureaucratic obstacles that impede access to subsidies must, however, be addressed. Access to leased equipment appropriate for varying scales of farming must be improved, as should support for the transportation and food-processing infrastructure required for a healthy and functioning food system. The government must also encourage financial institutions to extend long- and short-term credit to smallholder agricultural producers.

Rural credit programs, preferential taxation, and insurance for such producers might be considered.

The lack of state support for the country's agricultural research centers is impeding research efforts, the advancement of new technologies, and ultimately the ability of agricultural producers to enhance productivity and develop their livelihoods. In addition to increasing funding for research and development, the government should enhance opportunities for knowledge sharing both within regions and across oblasts. Given the inexperience of many Kazakh farmers, state or privately funded conferences, conventions, and focus groups, as well as university and research center–sponsored events, could give farmers, professionals, and researchers opportunities to share positive and negative experiences, exchange knowledge and technology, and strengthen support networks.

Kazakhstan's government has recently expressed a greater interest in diversifying its economy away from oil dependence and pursuing rural development (UNDP 2004). Future policy should reflect this shift in priorities and strengthen production of fruits and vegetables to decrease reliance on wheat and cotton alone. Offering incentives to stimulate small and medium-sized businesses domestically could enhance domestic markets for such products as well as support the creation of new businesses in the food-processing and transportation industries, upon which the agriculture sector relies for sale of goods.

Above all, policy makers need to apply common sense and humility when considering policy alternatives. The knowledge and talents of local communities can provide in-depth and practical direction for policy. Whether policy makers consider the unique cultural, historical, and geographic characteristics of certain regions and populations can largely determine how well a policy will be accepted by a community and to what degree it will be effective. In Kazakhstan this is particularly true—the nation houses an abundance of different cultures with histories and values as diverse as the myriad societies that shaped the region.

Land Tenure Reform

Land tenure reform in Kazakhstan must be grounded in clearly defined, equitable land distribution policies that provide local and regional officials with adequate authority and resources to enforce laws and respond to the concerns of land share and land plot owners. In light of the greater productivity of individual farms and the potential of these operations to supplement family wage incomes and food stores and provide for secure livelihoods, future policies should consider subsidies for land share owners and former sublessees. People eligible for Targeted Social Assistance or involved in low-wage labor could be specially targeted for assistance in purchasing land for private use in order to supplement their income and improve food security.

Large corporate farm managers still exercise a great degree of power in local and regional circles and are comparable to town mayors. Unfunded local mandates and the lack of local self-government in Kazakhstan are considerable impediments to enforcement of land reform measures and to checks on the corruption of powerful farm managers. Changes in the power distribution at different scales of government, as well as increases in budget appropriations to local authorities, should be considered to allow local government bodies to carry out their civic duties. If proper resources were allocated, greater responsibility could be placed on local and regional officials to ensure that farmers are aware of their rights as landowners and understand legislation. Communication channels could be opened to allow agricultural producers to voice questions and concerns about land reform measures. A system of checks and balances, initiated at the state level and extended to regional and local levels, would also improve the protection of individual land rights (not to mention civil rights), especially of the people most disenfranchised by the fallout of the Soviet collapse and most at risk of food insecurity and general poverty.

Rangelands

More public funding is needed for services that support the health and productivity of the livestock holdings of individual and family farms. Improved access to high-quality veterinary services and feed, as well as appropriate marketing strategies, must be addressed. Policy options for how best to preserve the nation's fodder base must also be weighed. Although the historical nomadic herding system is fading in present-day Kazakhstan, the system's inherent preservation of rangeland resources offers lessons. Creative solutions must be considered to increase fodder storage facilities and to develop a grazing system that allows herders to seasonally rotate herds in more extensive

pasturelands to prevent overgrazing and deterioration of resources.

The potential economic gains resulting from enhanced livestock productivity should be a strong incentive for the government to bolster its public support for rural livestock holders and the rangelands resources on which they depend.

Water Resources

Water resource policy should aim to curtail and reverse current degradation of resources and rehabilitate previously mismanaged waters. More ambitious policies that limit water withdrawals to long-term sustainable levels, enact and enforce environmental restrictions on petroleum extraction around the Caspian Sea, prevent industrial waste discharge into surface and groundwaters, and seek to incrementally reverse the heavily water-dependent cotton monoculture around the Aral Sea should be considered. The Kok-Aral Dam has the potential to restore the Syr Darya delta, increase water levels and help restore marine biodiversity. Relying on this dam to solve all the ills of the region, however, would be a mistake. Local NGOs in the Aral Sea region are a unique resource that could help to immediately funnel greater support to the struggling fishers and farmers of the region.

The International Red Cross has intervened in the regions around the Aral Sea to deal with the initial outbreaks of tuberculosis and chronic diseases that began increasing in prevalence in the 1990s. Kazakhstan should still draw upon the support of international aid organizations in health emergencies, but increasing percentages of state oil revenues could be dedicated to rehabilitating soils, water, and the public health of the population around the sea.

Policies need to address industrial, agricultural, and domestic pollution of water resources while finding a way to revitalize watersheds to maintain their sustainability. The livelihoods, health, and welfare of the populations tied to these resources will depend upon the strength of the policies adopted and the degree to which they arise from community needs in affected areas.

Assignment

Your assignment is to advise the government of Kazakhstan on how best to reform and integrate its policies on land tenure and agriculture with proper stewardship of natural resources to improve rural health and welfare.

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Chapter Twenty-Two
Allocating Irrigation Water in Egypt (8-4)
by Birgitte Gersfelt

Executive Summary

Agricultural production in Egypt is virtually fully dependent on irrigation. Egypt gets more than 95 percent of its annual renewable water resources from the Nile, and the construction of the High Aswan Dam, which was completed in 1971, has allowed Egypt to take full advantage of its share of Nile flows and increase both cropping intensity and size of the cultivated area. Egypt may face significant water scarcity within the foreseeable future, however, because of the combination of a more or less fixed supply of fresh water and increasing demands for water owing to population growth and reclamation of desert land for agricultural production. Because agriculture is the major water user in the Egyptian economy, it will be important to ensure efficient allocation of irrigation water across users and uses.

In situations characterized by water scarcity, irrigation activities may be associated with several types of externalities, which in turn have implications for water use efficiency. A classic externality is when some farmers are able to appropriate as much water as they like while the other farmers receive only what is left over, resulting in possible drought damage to their crops. Another type of externality arises because not all water applied to the fields ends up being consumed (that is, evapotranspired) by the crops. Parts or all of the excess water may subsequently be returned to the basin water system and become available for another diversion cycle. Thus, even if individual farmers use inefficient irrigation technologies, this need not result in large water losses at the river basin level. Both of these externalities are present in various regions in Egypt and should be considered when designing policies for efficient allocation of irrigation water.

Using water in a socially efficient manner is not merely a question of physical efficiency in water use. Whereas improving physical efficiency is about conserving water by increasing the share of water applied that is beneficially used, increasing economic efficiency is about maximizing the economic value of water use through physical measures and allocation of water between water uses and users (Cai et al. 2001). Within the cropping sector, economic efficiency may be improved by reallocating water from low- to high-value cropping activities or in some cases by adjusting the choice of production technique and using deficit irrigation (that is, applying less than the full crop water requirement).

Many different policy instruments can be used to regulate farmers' use of water. The options include volumetric taxes and non-volumetric taxes (like crop-specific land or output taxes), various types of quotas, market-based allocation mechanisms, and user-based allocation mechanisms. The degree of efficiency that can be achieved in water allocation differs across these policy instruments, and so do the costs of implementing the policies. Regulating farmer water use has not only efficiency implications, however, but also distributional implications. Stakeholders in irrigation water allocation issues may be roughly divided into three groups: farmers, agents outside agriculture like industries and households, and agents in other countries. Although efficiency in water allocation policies should be an important matter for everyone in regions with water scarcity, stakeholders are also likely to be highly concerned with the distributional implications, which depend on the choice of policy instrument. All these aspects consequently must be taken into account when choosing what policy mechanisms to use for allocating scarce irrigation water resources in Egypt and elsewhere.

Your assignment is to discuss the efficiency and distributional implications of using tax policy instruments versus quota policy instruments to regulate farmers' use of irrigation water. Then, based on the features of the Egyptian economy and irrigation system, design a policy strategy for regulating farmers' use of irrigation water in Egypt, considering economic efficiency aspects, implementation costs, and stakeholder issues.

Background

Egypt is characterized by an arid climate with very limited rainfall. The vast majority of the country is desert land, and crop production is virtually fully dependent on irrigation. The Nile supplies more than 95 percent of Egypt's annual renewable water resources, and Egypt is not likely to be able to significantly augment its supply of Nile water. Because demands for water are meanwhile increasing in Egypt, the country may well experience significant water scarcity within the foreseeable future.
The major water user in the Egyptian economy, agriculture accounts for more than 80 percent of total water diversions in Egypt (Mohamed 2001). Given the prospect of water scarcity and the agricultural sector's dependence on irrigation, it is important to consider what policy instruments can be used to achieve an efficient allocation of irrigation water across farmers and crops. The present case will provide an introduction to the issues of efficiency in irrigation water allocation and policies targeting farmers' use of irrigation water with particular reference to the Egyptian irrigation system.

To appreciate the irrigation water policy issues facing Egyptian society, it is necessary to first consider the characteristics and complex nature of the Egyptian irrigation system. The background section will therefore present an overview of the Egyptian irrigation system, and the subsequent sections will explore policy issues, stakeholders, and policy options.

The Egyptian Water Balance

The Nile Delta has been under cultivation for more than 5,000 years (Abu-Zeid and Rady 1992). Initially irrigation practices were intimately related to the natural flow of the Nile, characterized by the summer Nile flood, which reaches Egypt in late July and recedes in late October. Over time the irrigation system was developed in various ways to expand agricultural production possibilities, and complete control of the Nile flows was finally achieved by the construction of the High Aswan Dam, which was completed in 1971. Lake Nasser in front of the High Dam has a storage capacity of 164 billion cubic meters (BCM), amounting to almost twice the average annual Nile inflow of 84 BCM. The High Dam has thus allowed Egypt to take full advantage of its share of Nile flows by evening out these flows across seasons and between years. This water availability in turn has resulted in significant increases in both cropping intensity and size of the cultivated area.[1]

The Nile Basin is spread over 10 countries—Burundi, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda, and Zaire—and Egypt is located downstream from the 9 other Nile Basin countries. So far the use of Nile waters has largely been governed by two treaties—one from 1929 between Egypt and Britain and one from 1959 between Egypt and Sudan. The 1929 treaty stipulates that no country can engage in projects that reduce the amount of water reaching Egypt, and the 1959 treaty governs the division of Nile waters between Egypt and Sudan (Nkrumah 2004). Under the 1959 treaty Egypt and Sudan are respectively afforded 55.5 and 18.5 BCM of Nile water annually, and evaporation and other water losses from Lake Nasser account for the remaining 10 BCM of average annual Nile flow (FAO 2005).

Egypt has had favorable access to Nile waters under the two treaties, and the country therefore cannot expect to increase its share of Nile flows to cover the rising domestic water demands. In fact, upstream countries' desires to use Nile water might in the future lower the amount of Nile flows reaching Egypt, although cooperation with upstream countries may also open up technical solutions to augment Nile flows by reducing seepage and evaporation losses.[2] Egypt also has some water

[1] The construction of the High Aswan Dam has also implied that the fertile sediments, which come with the Nile floodwaters, no longer reach the Nile Valley and Delta but instead accumulate in Lake Nasser.

[2] One option for reducing evaporation losses is the construction of the so-called Blue Nile Reservoirs in Ethiopia. These reservoirs would make it possible to shift over-year storage from Lake Nasser upstream to the upper Blue Nile region, where evaporation rates are around 50 percent of the rates in Egypt and Sudan (Whittington et al. 1995). A total of 85 percent of Egypt's water supply originates in Ethiopia, however, and the issue of how to secure a regular supply of water if the Blue Nile Reservoirs were constructed is clearly very important to Egypt.

Another project, which also seeks to reduce the amount of Nile evaporation losses as well as losses from seepage and over-bank flows to swampland, is the so-called Jonglei project. This project consists of a series of canals designed to drain water from the vast Sudd Swamps in southern Sudan. The project was stalled because of the instability in the region, and environmental concerns have also been raised in the discussions about resuming the project (Whittington et al. 1995; Bader 2004).

sources unrelated to the Nile, including fossil groundwater, and these water sources may provide some additional water in the future. Egypt is not likely, however, to be able to substantially increase its supply of freshwater in the short to medium term.

Egyptian water demands, on the other hand, will increase noticeably in the coming years. In 2005 the Egyptian population had reached 74 million people and was growing at an annual rate of 1.9 percent (World Bank 2007). The growing economy and population can be expected to increase the demand for water in and of themselves. The implications of the growing population are further compounded, however, by the fact that although Egypt is a large country, only a small fraction of the land is cultivable. In 1997 agricultural land holdings amounted to approximately 8 million *feddan*,[3] which corresponds to less than 5 percent of the total land area.

The need to feed the growing Egyptian population early on led the Egyptian government to adopt a strategy of expanding the country's limited agricultural area by reclaiming large amounts of low-quality desert land (Hvidt 1998). The Land Master Plan of 1986 estimated Egypt's additional reclaimable lands at approximately 3.4 million *feddan* (Hellegers and Perry 2004). According to Hanna and Osman (1995), the major objective of the land expansion is to increase the production of food, feed, and fiber for the growing population, while also providing work opportunities and alleviating population pressure on the old cities and the ensuing loss of cropland to urban development. According to the Ministry of Water Resources and Irrigation (2005a, 2-31–2-32), "[t]he present agricultural strategy is not based on self-sufficiency but on food security, using Egypt's competitive advantages.... Egypt is increasingly in a position to produce higher-value food crops (e.g. fruits and vegetables) and non-food crops (e.g. flax and cotton) and trade them to purchase staples and have additional revenue and employment as well. Maximizing national income is therefore considered a more reliable approach to food security than self-sufficiency."

Although progress in land reclamation has generally been much slower than planned (Mohamed 2001), the land reclamation plans remain very ambitious, aiming to increase agricultural land by more than 35 percent compared with the 1997 level (Ministry of Water Resources and Irrigation 2005b). These land reclamation plans require substantial amounts of irrigation water, and if they are carried out, Egypt may thus face significant water scarcity within the foreseeable future.

General Features of the Egyptian Irrigation System

The Egyptian irrigation system is enormous and highly complex. Hvidt (1998, 10) reports that the system consisted of "the Aswan High Dam, eight main barrages..., approximately 30,000 km of public canals, 17,000 km public drains, 80,000 km private canals (*mesqas*) and farm drains, 450,000 private water lifting devices..., 22,000 public water control structures, and 670 large public pumping stations for irrigation."

The water delivery canals in the Nile irrigation system are classified hierarchically starting with the principal canals (which receive water directly from the Nile) through the main canals to the branch canals and the distributary canals. *Mesqas* (private ditches) receive water from the branch canals or the distributary canals and distribute this water either directly to the fields or into *marwas*, which are private off-takes from the *mesqas* conveying water to fields located away from the *mesqa* (Hvidt 1998). A similar hierarchy exists for the drainage system. The state is responsible for the entire irrigation and drainage system above *mesqa* level. The *mesqas* are owned (although not necessarily constructed) by the landowners, and they are responsible for maintaining the *mesqas* and field drains (Hvidt 1998).

The state distributes the irrigation water across the different segments of the irrigation system. Before 1992 cropping patterns in Egypt were determined by the state. Based on information on cropping patterns, the water requirements of each crop, the size of planted area, and the soil type, as well as the expected conveyance losses and on-farm losses, the Ministry of Agriculture and Land Reclamation was able to calculate the amount of irrigation water required for the following year. The request for irrigation water would then be sent to the Inter-Ministerial Committee on Water Planning, along with requests for water from other concerned ministries, and a day-by-day plan for releases from the High Aswan Dam would be drawn up, including

[3] A *feddan* is the Egyptian area measurement unit. One *feddan* corresponds to 0.420 hectare (or 1.037 acres) (World Bank 1993).

the allocation of these releases between the different segments of the irrigation system. After 1992 cropping patterns were liberalized, however, and it consequently became difficult to calculate the needs for irrigation water and ensure appropriate allocations of irrigation water to the different segments of the irrigation system (Hvidt 1998, 2000).

The problems of allocating water appropriately across the different segments of the Egyptian irrigation system will be compounded by increasing water scarcity because the traditional Egyptian irrigation system has not been constructed to handle scarcity. According to Hvidt (1998, 9) "up to the present day, the system has been characterized by water abundance.... The structure, management, and technical properties of the [traditional] Egyptian irrigation system have been designed and operated within a situation of water abundance, which means that up to the late 1980s very little emphasis was placed on improving the efficiency of water use." As the following sections will outline, this system has implications for the policy options that can be used to promote efficient water use by farmers.

Regional Differences in Irrigation Practices

Egypt can be split into two major regions with different agricultural and irrigation characteristics. The so-called Old Lands encompass the Nile Valley and the Nile Delta, which have been cultivated since historic times. The so-called New Lands, on the other hand, are desert areas that have been reclaimed for cultivation since 1953 (Skriver and Moeslund 1998). The technical and hydrological characteristics of the land and irrigation system vary significantly across these regions of Egypt, with implications for the irrigation policy issues.

The Old Lands regions are characterized by clayey soils, and water is normally applied to the field using surface irrigation techniques. These techniques generally have lower application efficiencies than the modern and more capital-intensive sprinkler and drip irrigation techniques. Consequently, the field irrigation efficiency—defined as the fraction of water applied to the field that ends up being consumed by the plants—will, other things being equal, be lower under surface irrigation techniques than under sprinkler or drip irrigation.[4,5] The remaining water, which is not consumed by the crops, either ends up in the drains or percolates into the ground. In the Nile Valley, drainage water is returned to the Nile or to the main irrigation canals, whereas in the Delta, drainage water is either pumped back into the irrigation canals for reuse or pumped into the northern lakes or the Mediterranean Sea (FAO 2005). In most of the Delta and Nile Valley, water that percolates into the ground either returns to the river or recharges the shallow Nile aquifer from where it can be recovered (Keller et al. 1996).[6] Return flows from the Nile Valley are thus virtually fully recoverable, and return flows from the Delta are partially recoverable.

In the traditional irrigation system in the Old Lands, water is delivered to farmers on a rotational basis, which is normally applied at the branch canals. There are different types of rotations, but one typical rotation pattern in Middle Egypt entails that water will be on for 5 days and then off for

[4] Surface irrigation techniques apply water to the field by gravity flow either by flooding the entire field (basin irrigation), feeding the water into small channels (furrows), or feeding the water to strips of land (borders). Sprinkler irrigation resembles rainfall because water is pumped through a pipe system and then sprayed onto the crops through rotating sprinkler heads. Drip irrigation, on the other hand, conveys water to the field through a pressurized pipe system from which it drips slowly onto the soil through emitters located close to the plants (Brouwer et al. 1988). According to FAO, average field application efficiency for sprinkler and drip irrigation is 75 percent and 90 percent, respectively, compared with 60 percent for surface irrigation techniques (Brouwer et al. 1989, annex 1). These general field application efficiency numbers do not account, however, for the effects of different soil types on overall field irrigation efficiency. According to Caswell and Zilberman, "the fraction of water applied which is actually utilized by the plant is a function of the water-holding capacity of the soil and the method of water application" (Caswell and Zilberman 1986, 799). Clayey soils, like the ones found in the Old Lands, tend to be less water-permeable than sandy soils, which are found in large parts of the New Lands.

[5] Crop water consumption is here equated with crop evapotranspiration. Evapotranspiration is defined as the "the combination of two separate processes whereby water is lost on the one hand from the soil surface by evaporation and on the other hand from the crop by transpiration" (Allen et al. 1998, 1).

Precipitation is generally disregarded in the present case study, because it is not a relevant factor for agricultural production in Egypt. It is implicitly assumed that the entire water requirement of the crop is covered through irrigation.

[6] In the northern part of the Delta, drainage and groundwater salinity levels are quite high, and these water flows are therefore of limited value for reuse (Keller et al. 1996).

the following 10 days. When the water is on in the local segment of the irrigation system, each farmer simply pumps irrigation water from the open *mesqas* using a pump that the farmer either owns himself or hires when he wants to irrigate. Irrigation water is generally delivered below field level, and thus farmers incur pumping costs when irrigating. This cost in principle should give them an incentive to conserve water, but over time low-cost powered pumps have become available, lowering the cost of pumping and reducing the time it takes to pump a given amount of water (Hvidt 1998; Abu-Zeid 1995; Hellegers and Perry 2004).

The rotational irrigation system suffers from a number of drawbacks. The system is ill suited for cultivation of short-rooted crops like vegetables, which require more frequent irrigation, and it is very difficult to secure an even distribution of water along the canals, which in turn results in unequal water deliveries and so-called tail-end problems (see the next section). Inadequate deliveries of water have led many farmers to manipulate the system in various ways to deliver larger amounts of water. In some locations, the rotation schedule is also observed somewhat loosely, making it difficult to predict when irrigation water will be available. Farmers may thus have rather limited water control, which in turn leads them to adopt inefficient irrigation practices like irrigating too soon and applying too much water. According to Hvidt (1998), studies have shown that farmers have applied 50 percent to 250 percent more water than required by the crops and for the purpose of leaching.[7] In addition to these problems of the rotation system, the structures of the irrigation system are also old and deteriorating, and farmers also increasingly face water pollution problems (Hvidt 1998; Hellegers and Perry 2004).

To address the shortcomings of the traditional irrigation system as well as the predicted demands of the 21st century, Egypt has adopted the Irrigation Improvement Project (IIP). The IIP calls for improving about 3.5 million *feddan* (of which some 70 percent are located in the Delta) by the year 2017 (Ministry of Water Resources and Irrigation 2005a). Given the speed of implementation, however, the total area covered by IIP in 2017 is likely to be somewhat smaller.

[7] Leaching here refers to the practice of applying extra irrigation water in order to prevent salts from building up in the soil (that is, salinity control).

The purpose of the technological package implemented under the IIP is to ensure efficient water use and optimal crop production by giving farmers the flexibility to irrigate at the time, rate, and duration required by their crops. The IIP package includes both technical and social changes to the irrigation system. The fundamental change introduced by the IIP is the replacement of individual farmer pumping at multiple points along the *mesqa* with collective pumping at a single point. To this end, the IIP introduces continuous flow in branch and distributary canals, high-level *mesqas* with single point lifting, water user associations (WUAs), downstream control/demand irrigation, and an Irrigation Advisory Service (IAS) (Hvidt 1998).

The aim of replacing the rotational operation of the branch and distributary canals with continuous flow is to enable farmers to irrigate according to the water needs of their crops. Continuous flow only implies continuous availability of water, however—not increased amounts of water. Each command area will still receive the same amount of water each month as it did under the old rotational system. The old *mesqas* below field level are being replaced by elevated concrete-lined *mesqas*. Instead of the previous system in which individual farmers pumped water at multiple points along the old *mesqas*, water is pumped from a single point at the branch canal into the elevated *mesqa* and then flows by gravity within the *mesqa* to the field outlets. Only two or three farmers will typically be able to take water at the same time. Water user associations will schedule irrigation flows among the different farmers (Hvidt 1998; Hellegers and Perry 2004).

Hellegers and Perry (2004) point out, however, that the new IIP system is not problem free. Introducing pumps at the head of *mesqas* without ensuring sufficient capacity in the distributary canals may simply move the supply constraint upstream to the distributary canals. Furthermore, there is some evidence to suggest that farmers have found the new pumps at the head of the *mesqas* unreliable. Many have therefore resorted to installing their own pumps and drawing water directly from the distributary canals, thus circumventing the new *mesqas*. The construction standards for the new elevated *mesqas* have also been poor, and failures in the aboveground system are unfortunately much more serious than failures in the traditional below-ground system. Finally, there is the issue of volumetric measurement of water

allocations, which was not feasible under the traditional system owing to the individual multipoint pumping system. The new system is in principle capable of measuring the amount of water farmers pump into the elevated *mesqa* (thanks to the collective single-point pumping mechanism), but this often does not work, and volumetric water allocation can therefore not yet be used to balance supply and demand (Hellegers and Perry 2004).

As mentioned, the land and irrigation characteristics of the New Lands differ substantially from those of the Old Lands. The soils in the New Lands are typically sandy or calcareous and poor in organic matter. The New Lands are located at the ends of the irrigation system and mostly outside the Nile's drainage basin, and farmers in the New Lands are required by law to use either sprinkler or drip irrigation (FAO 2005; Hellegers and Perry 2004). Unlike surface irrigation, sprinkler and drip irrigation typically require a continuous supply of water. The modern irrigation system in the New Lands implies that metering water at the point of delivery is in principle possible (Abu-Zeid and Rady 1992).

The New Lands also differ from the Old Lands with respect to yields, crop water requirements, and cropping patterns. Crop yields tend to be substantially lower in the New Lands than in the Old Lands. According to the Ministry of Water Resources and Irrigation (2005a, 2-31), "this is expected to improve with time, but initially, newly reclaimed lands do not achieve the yields of the older lands." Crop water consumption rates are in many cases also higher in the New Lands (Mohamed 2001, appendix). In 1997/98, however, the average value of production per area unit was higher in the New Lands than in the Old Lands, because the higher-value fruit and vegetable crops make up a significantly larger share of the cultivated area in the New Lands than in the Old Lands (Ministry of Water Resources and Irrigation 2005a).

Policy Issues

Agriculture is, as previously outlined, the major water user in the Egyptian economy. As water scarcity becomes more pronounced, it will become even more important to ensure efficient use of irrigation water.

Externalities and Different Measures of Water Use Efficiency

There are many aspects to the notion of using irrigation water efficiently. One of the important issues is how to ensure an efficient allocation of water resources across different farmers. Although irrigation water is an important input in agricultural production in developing countries, there is often no market for irrigation water. In some cases, the state or groups of water users may have formulated water allocation policies or mechanisms themselves to compensate for the missing water market, but these water allocation policies are not necessarily designed to ensure an efficient allocation of irrigation water across users.

If the right quantities of water were always available at the right time, in the right place, and with the right quality, there would be no need for markets or other types of mechanisms to regulate the allocation of water. When some kind of water scarcity prevails, however, whether it is a global, local, or seasonal phenomenon, the lack of mechanisms for allocating water efficiently between competing uses will result in inefficient use of water resources and water users' imposition of externalities on each other. A classic example of externalities in irrigation is the so-called head-end–tail-end problem, where farmers at the head of the system can appropriate as much water as they like, whereas farmers in the tails of the system receive only what is left over, resulting in possible drought damage to their crops (Perry et al. 1997). In Egypt there is ample scope for farmers to impose these kinds of negative externalities on each other owing to the lack of mechanisms for efficiently regulating individual farmers' appropriation of water. As outlined in the previous section, although the centralized water allocation system does imply a kind of quota scheme for allocating water between different segments of the irrigation system, the traditional irrigation infrastructure in the Old Lands has not allowed for a quota scheme to be implemented at the individual farmer level.

This type of externality related to farmers' water diversions can typically be attributed to ill-defined (or in some cases poorly enforced) property rights over irrigation water. It is well known from the general literature on externalities that inefficiencies from externalities can be alleviated through a variety of policy instruments, including taxes, quotas, or the establishment of some sort of bargaining or market mechanism. As noted by

Turner et al. (2004), all these instruments imply the explicit or implicit assignment or modification of the property rights to the water resource. The inefficiencies of the water diversion externality are thus alleviated by explicitly or implicitly addressing the underlying cause of the externality.

Another aspect of efficient use of irrigation water is to minimize nonbeneficial losses of this resource. Looking at the individual farmer's use of water, substantial amounts of water may be lost through the use of inefficient irrigation technologies. As already mentioned, surface irrigation techniques tend to generate lower field irrigation efficiency than modern sprinkler and drip irrigation technologies. Surface irrigation techniques may therefore, other things being equal, result in the loss of a higher fraction of water applied than sprinkler and drip irrigation.

What matters from society's point of view, however, is not necessarily the irrigation efficiency of the individual farmer. As noted by Perry et al. (1997, 10), "[o]ne of the most important, yet least appreciated, facts about water is that in a basin, a substantial amount of it is recycled." In irrigated agriculture the recycling of water stems from the fact that the part of the applied water that is not consumed may be returned to the basin water system. This recycling occurs if drainage water is channeled back to the main water source or irrigation canals or if water that percolates into the ground ends up in aquifers from where it can be retrieved. What matters from a social efficiency point of view is thus not necessarily how much water is applied to the field, but rather how much water is actually consumed by the plants or otherwise irretrievably lost, because this is the amount of water that is in fact taken out of the system.[8] The recoverable return flows thus constitute another type of externality arising from irrigation activities when they become available for yet another diversion cycle "at another time, another place, and at another quality" (Perry et al. 1997, 10).

In most of the Old Lands in Egypt, drainage water is returned to the Nile or the irrigation canals and most percolation flows end up in aquifers from where they can be retrieved. Although farmers in these areas use a less efficient irrigation technique, this consequently does not result in large water losses at the basin level. In the New Lands, on the other hand, water that percolates into the ground is generally lost. It is therefore important to use the more efficient irrigation techniques in these areas, as mandated by law. Another factor that tends to reduce potential water losses in the Old Lands while increasing them in the New Lands is soil type. The clayey soils in the Old Lands are less water permeable than the sandy soils in the New Lands.[9]

Although the concept of water system (or basin) efficiency is important, it also has its limitations from an economic point of view, because it relates only to the physical quantities of water and consequently does not address the issue of whether water is being used in the most economically productive way. Although improving physical efficiency is about conserving water by increasing the fraction of water applied that is beneficially used, increasing economic efficiency is about maximizing the economic value of water use through physical measures and allocation (or reallocation) of water between water uses and users (Cai et al. 2001).

The differences in the value of water in alternative uses can be captured by the concept of water productivity. Water productivity can be increased either by increasing the amount of a given output per input unit of water or by reallocating water from lower- to higher-value production either within the agricultural sector or between sectors (Molden and de Fraiture 2000). Within the cropping sector, economic efficiency may thus be improved by reallocating water from low- to high-value cropping activities (Keller et al. 1996). Economic efficiency can also be improved by adjusting the choice of production technique, as in some situations it may be more efficient to produce crops by using less than the full crop water requirement (that is, water-stressing the crops through deficit irrigation) even though this practice also reduces crop yields. To maximize the social economic efficiency of water, however, the use of water must be evaluated using social prices rather than market prices, because the latter may not reflect the true social costs and benefits. Water use can then be retargeted to the activities producing

[8] The quality of the return flows will typically be lower, however, than the quality of the water initially applied (see the next section).

[9] Water losses also occur from the water conveyance and distribution system. Such water losses include both seepage and nonbeneficial evaporation. The former types of water losses may be recoverable, however, if the seeping water ends up in an accessible aquifer. There are also substantial evaporation losses from Lake Nasser behind the High Aswan Dam.

the highest socioeconomic returns through the introduction of various price and nonprice "demand management" measures (see Mohamed 2001).

Water Quality and Cost Recovery

The discussion of water scarcity implications has so far focused on water quantity. Water scarcity is not merely an issue of quantity, however, but also an issue of quality, because severe deterioration in water quality may render water unusable. Every time water is diverted and used for irrigation, the quality of the resulting return flows will be lower than the quality of the water that was applied owing to increased concentration of salts and pollutants. Thus, on its way from the High Aswan Dam to the Mediterranean Sea, the salt and pollution concentration of the Nile increases. Mohamed (2001) cites a study from 1995, however, that suggests that polluted spots were still localized in the Nile system and states that water quality was still adequate for most uses upstream from the Delta. Throughout the Delta, severe water pollution is found downstream from large communities and industrial cities (Mohamed 2001).

Another issue, which is connected to the notion of efficiency in water use, is the degree to which the costs of delivering the water are covered and carried by the appropriate agents. Traditionally the costs of operating and managing the irrigation and drainage system, as well as investments and rehabilitation costs, have been borne by the Ministry of Water Resources and Irrigation. Apart from the cost of pumping water onto their fields, farmers have not paid directly for their irrigation water, but they do pay land taxes, which cover part of the cost of the irrigation system.[10] These land taxes, however, do not depend on crop type or the amount of water used (Hellegers and Perry 2004). Before the liberalization of agricultural policies in the 1990s, farmers were also taxed indirectly through the mandatory sales of agricultural produce to the state at low prices, but after liberalization farmers are rather free to determine what to grow and whom to sell it to (Ministry of Water Resources and Irrigation 2005a; Hvidt 1998). Because the land taxes do not cover all the costs of delivering irrigation water and maintaining the irrigation and drainage system, the state must cover these expenses through other revenue sources. The provision of irrigation water is thus in effect subsidized, which tends to encourage socially inefficient use of this resource.

Stakeholders and Policy Options

Water is a resource that affects everyone in society on a daily basis. The group of stakeholders in water allocation issues thus ultimately includes the whole society. Furthermore, because water flows across national borders, parties outside the country in question may also be considered stakeholders to the extent that they are influenced by the water allocation policies. Efficiency in water allocation should thus be an important matter for virtually everyone in regions where water scarcity prevails. Many stakeholders, however, are more likely to care about the income and distributional consequences of water allocation policy instruments.

The group of agents that is most directly influenced by the choice of irrigation water allocation policies consists of Egyptian farmers. Using tax policy instruments to regulate farmers' use of water will, other things being equal, have a negative impact on farmers' income unless the tax revenue is somehow returned to the farmers. Depending on the degree of water scarcity and hence the degree to which farmers' water use must be curtailed, the reductions in farmer incomes may be substantial. According to a study by Löfgren on water cost recovery and water scarcity in Egypt, reducing farmers' water use by 15 percent through water charges would lead to a 22 percent reduction in net farm incomes (Löfgren 1996).

Although it seems reasonable to assume that farmers' net income will be reduced if water use is regulated through a tax mechanism, the distributional implications of water-regulating policies for groups of farmers are not a priori clear. Certain policy schemes may inadvertently result in redistribution between different regions of the country. This would be the case, for instance, if farmer water use were to be regulated through a single set of crop-specific land taxes based on the average national water consumption rates for each crop. Such a tax scheme would tend to favor the New

[10] Some parts of the New Lands are irrigated by groundwater, and according to a World Bank study (2001) farmers pay the full cost of groundwater abstraction in the New Lands. Farmers also repay on-farm investments that are part government programs (like the Irrigation Improvement Project), but there is an extensive grace period for repayment of these investments, which amount to a subsidy (Ministry of Water Resources and Irrigation 2005a).

Lands at the expense of the Old Lands to the extent that crop water consumption rates are higher in the New Lands than in the Old Lands (Gersfelt 2007).[11] If, on the other hand, tax rates were regionalized, it would alleviate these types of regional redistribution issues.

Farmers may also be heterogeneous within regions, differing, for instance, with respect to soil type, degree of land leveling, access to input and output markets, managerial skills, and water-regulating policy may result in redistributions between farmers. This is not to say that redistributions are necessarily negative—in fact, they may be desirable from society's point of view. Regardless of social desirability, however, redistributions will often meet with political opposition, which may make it difficult to implement the necessary reforms of the water allocation mechanism.

Cultural and religious factors may also have implications for whether it will be possible to implement a given set of water-regulating policies. Hellegers and Perry (2004) report that although it is in principle acceptable to charge for the service of providing water in Egypt, charging for irrigation water itself is not acceptable, which makes volumetric water charges a contentious issue. It is thus not surprising that "charging agriculture for water and water services is ... a politically sensitive issue in Egypt" (Hellegers and Perry 2004, 41). According to Gutner (1999), there has generally been a legacy of government caution toward economic reforms in Egypt since the 1977 riots, which were sparked by cuts in the food subsidy program, which led to high, sharp price increases that were perceived to be inequitable. Since then, however, the government has succeeded in reforming the food subsidy program by adopting a gradual approach. In the 1990s the Egyptian government also succeeded in reforming land rent legislation, which had protected and favored tenants by keeping land rents much lower than market value. Over the course of a five-year period, land rents were raised from 7 times the land tax to 22 times, and since October 1997 farm tenancy and land rents have been determined by the market (Nassar and Mansour 2003). It is consequently possible to implement such types of reforms in Egypt, provided it is done in a gradual manner. Furthermore, attitudes toward water pricing might also slowly start to change as water becomes scarcer and the need for a transparent and efficient water allocation mechanism becomes more evident.

One alternative to using tax policy instruments to regulate farmers' water use is to use quotas, which could be allocated to farmers free of charge. If farmers are highly heterogeneous, however, it may be quite costly to determine the socially optimal farmer-specific quotas. Furthermore, to be accepted by farmers, the quota assignment process would probably have to be not only transparent, but also based on criteria perceived to be fair. Quotas by themselves would also not generate the revenue to cover the part of the operation and maintenance costs for the system that the state is currently subsidizing. The revenue from tax policy instruments, on the other hand, could be used to cover these expenses, and any remaining revenue could in principle be channeled back to the farmers and the rural community.

Agents outside of agriculture like industries or households are also stakeholders in the national Egyptian water economy. In most countries, however, municipal and domestic water needs, as well as industrial and commercial water needs, are given priority over agricultural water needs (Perry et al. 1997), and this is also the case in Egypt. Water use by these nonagricultural agents may nonetheless still be affected by salts and pollutants in the return flows from agriculture. Moreover, unless the agricultural sector is made to bear its full share of the costs of operating and maintaining the irrigation system, these other sectors will in effect subsidize the irrigation system.

Agents outside of Egypt may also be stakeholders in the Egyptian national water economy. Egypt is the last country before the Nile reaches the Mediterranean Sea, so no countries are located downstream the Nile from Egypt. As already mentioned, however, upstream countries are also indirectly affected by Egypt's water policies. Under the 1929 and 1959 treaties, Egypt has assumed the right to veto upstream projects that would adversely affect its water interests (Nkrumah 2004). The upstream countries—with the exception of Ethiopia—were all colonies of European powers at the time the 1929 treaty was established, and they now strongly object to the treaty and renounce it as invalid. Egypt, on the other hand, has repeatedly stated that a unilateral change in this treaty would amount to a breach of international

[11] Regional differences in field irrigation efficiency and return flow recoverability would also affect the distributional implications for the different regions (see Gersfelt 2007).

law, and upper riparian countries may fear—not without grounds—that Egypt would use military power to secure control of Nile water. Discussions on these transboundary water-sharing issues are now taking place within the so-called Nile Basin Initiative, which includes the different Nile basin countries (Nkrumah 2004). Consequently, how Egypt chooses to address its domestic water challenge may affect the upstream countries with respect to the options and terms for future Nile Basin water agreements.

Policy Instruments

The policy instruments that can be used to regulate farmers' use of water include volumetric water taxes, non-volumetric taxes, quotas, market-based allocation mechanisms, and user-based allocation mechanisms (Johansson et al. 2002).

Volumetric water taxing implies that a tax is placed on the amount of water the farmer diverts for irrigating his fields, which in effect places a direct price on the farmer's water diversion. This approach can involve a single tax rate on water diversions or it can take more sophisticated forms, such as tiered pricing, where the water tax rate varies according to the amount of water diverted, or two-part tariff pricing, where the farmer pays a constant marginal price per unit of irrigation water purchased as well as a fixed annual or admission charge for the right to purchase water (Tsur and Dinar 1997).

Non-volumetric taxes seek to regulate a farmer's use of water by taxing other variables, which are somehow correlated with the farmer's use of water, and hence indirectly pricing the farmer's use of water. Possible non-volumetric taxes for regulating irrigation water usage include land taxes or output taxes.[12] The simplest form a land tax scheme can take is a uniform per area charge. Such a scheme can influence the farmer's use of water only through his decision about how large an area to irrigate. To affect the farmer's cropping pattern decision, land taxes (and also output taxes) can be made crop-specific so that they better target the differences in water requirements across crops.

Instead of using tax instruments, it is also possible to regulate farmers' water use through quotas. The most direct approach is to assign individual water diversion quotas to farmers, but the quota could in principle also relate to land use or output quantities. If a water quota or some other measure of farmer water entitlement is made tradable, water markets can be established and water can then be allocated through the market mechanism. Finally, water can also be allocated through user-based allocation mechanisms, which—as the name suggests—entail that the water users allocate the water among themselves. User-based allocation mechanisms require collective action institutions that have the authority to make decisions on water rights (Dinar et al. 1997).

The degree of efficiency that can be achieved in water allocation differs across these instruments. The following discussion will focus on the tax policy instruments, but many of these arguments also apply to the quota versions of these instruments.

A volumetric water tax targets the amount of water the farmer applies to the field. As outlined earlier, however, what matters from a social efficiency point of view is the amount of water consumed or irretrievably lost in the course of irrigation. When return flows are partially recoverable, volumetric water taxes will not be able to take account of crop-specific differences in field irrigation efficiency in a socially efficient way. The field irrigation efficiency would typically differ between rice and other crops because traditional rice production requires extra water for soaking the paddy fields. When return flows are partially or fully recoverable, a volumetric water tax scheme will therefore result in too heavy taxation of rice production, from a social efficiency point of view. If return flows are not recoverable, on the other hand, volumetric water taxes will in principle provide the socially optimal incentives for farmers' cropping pattern decisions.

Unlike volumetric water taxes, crop-specific land taxes would be able to account for crop-specific field irrigation efficiencies even when return flows are recoverable. Once the decision on cropping pattern has been made, however, crop-specific land taxes can no longer affect the farmer's use of water, because the marginal cost of applying more

[12] Non-volumetric taxes can also include taxes on other inputs than land. The implications of using taxes on other inputs to affect farmers' use of water have been studied by He (2004). Using agricultural sector models for Egypt and Morocco, she analyses the effect of using taxes on fertilizers, pesticides, and energy, as well as taxes on output, compared with the effect of using volumetric water pricing.

water to the same area is zero. Crop-specific land taxes will thus not induce farmers to adopt deficit-irrigation of the crop, which in some cases may be efficient from society's point of view, nor will they induce farmers to avoid misuse or overuse of water. In the case of crop-specific output taxes, there is a relationship between tax payments and water use, because yields tend to increase when water application increases (except in the case of overirrigation). It is not given, however, that a crop-specific output tax will lead the farmer to choose the socially optimal water-yield production technique (Gersfelt 2007).

In addition to these issues of how efficiently the different tax instruments can allocate water across crops and water-yield production techniques, there is also the issue of whether the policy instruments should be regionalized to capture regional differences in, for instance, crop water consumption rates, crop yields, field irrigation efficiency, and return flow recoverability, because basing tax rates on national averages for such variables can result in socially suboptimal allocation of water across regions (Gersfelt 2007).

The policy instruments differ not only in terms of their water allocation efficiency properties, but also in terms of their implementation costs. Although a given policy instrument may achieve a high degree of water allocation efficiency, high implementation costs may imply that this is not the most socially efficient choice of policy instrument for regulating farmers' use of irrigation water. Volumetric water taxes would require the ability to meter individual farmers' water diversions. As mentioned, this is not yet possible in the traditional irrigation system in the Old Lands, but in the future it may become possible in the areas covered by the IIP. Upgrading the entire irrigation infrastructure to allow for metering will require substantial investments, however, which would not only be costly, but also take a number of years to implement. Furthermore, even if meters are installed, it may be difficult to ensure metering of all farmers' water diversions. The reason is that if irrigation water is delivered in open canals, as is generally the case in Egypt, it may be difficult to prevent farmers located next to these canals from circumventing the meters by pumping the water straight from the canals and dodging the tax payments. This problem does not affect non-volumetric instruments like land taxes, because the tax in this case is levied on land use rather than on water.

In reality, implementing a volumetric water pricing system is also not simply a matter of getting the technology in place for metering farmers' water diversions. A regulatory framework must also be established, with procedures for measuring the amount of water delivered as well as procedures for partial deliveries, missed deliveries, excess deliveries, late deliveries, polluted deliveries, and so on. An administrative bureaucracy must be established to collect data on water deliveries to farmers and carry out the billing (Perry 2001). The establishment of such regulatory and administrative frameworks may be a significant barrier to the implementation of water policies in countries where regulatory structures and traditions are not yet strong and well developed.

Implementation of the non-volumetric policy instrument of crop-specific land taxes does not necessitate major investments in physical structures. Nonetheless, information must be collected on each farmer's allocation of land to different crops. Although collecting such information is not cost free, the implementation costs for land taxes are often deemed to be lower than the implementation costs for many of the other water policy instruments.

Implementing an output tax scheme requires information on output levels for each farmer. The cost of measuring these output levels will depend in part on the crop-marketing channels. In the special cases where the entire crop is marketed through a central state trading enterprise, measuring the level of output may be relatively inexpensive, resulting in low implementation costs. On the other hand, if some or all of the crop is either marketed through local informal markets or used for home consumption, then the costs of implementing an output pricing scheme can be very high. According to Tsur and Dinar, "the measurement of output can be as formidable as that of water" and examples of output pricing as a means for pricing water are rare (Tsur and Dinar 1997, 245).

As the preceding section has shown, each policy instrument has its pros and cons in terms of both efficiency and implementation costs. These aspects must all be considered and weighed against each other in the effort to design the most socially efficient policy schemes for regulating farmers' use of irrigation water.

Assignment

Your assignment is to discuss the efficiency and distributional implications of using tax policy instruments versus quota policy instruments to regulate farmers' use of irrigation water. Then, based on the features of the Egyptian economy and irrigation system, design a policy strategy for regulating farmers' use of irrigation water in Egypt, considering economic efficiency aspects, implementation costs, and stakeholder issues.

Additional Readings

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